DISPLACEMENT EFFECTS, ROLE OF THE AGENT, AND MENTATION CATEGORIES IN RELATION TO ESP PERFORMANCE

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ABSTRACT

The three experimental studies in this dissertation investigated a number of aspects of 'general extrasensory perception' (GESP) in a free-response task, using the ganzfeld technique to promote the occurrence of ESP in a laboratory setting.

In the first such study, the role of the agent's attention in affecting target-related scoring and in contributing to the occurrence or prevention of displacement was of primary interest. Although overall scoring tended to be above chance (significantly so according to a post-hoc analysis of the data of one of two independent judges, ($p(\text{one-tailed}) < 0.025$), scoring with an agent was only slightly higher than without an agent, and the inclusion of the control pictures with the target picture in the agent's presence did not result in discernible evidence of displacement, although in that condition the highest mentation-picture correspondence ratings assigned on each trial correlated significantly and positively with high motivation for one judge ($p(\text{two-tailed}) < 0.05$) and with bad mood for the other judge ($p(\text{two-tailed}) < 0.05$). No measures of the percipients' attitude to the various pictures in the target set related to target or displaced ESP scoring, although there was strong evidence ($p < 0.0002$) that percipients were swayed in their judgement of correspondence by their liking for pictures. Finally, in accordance with prediction, scoring was significantly ($p(\text{one-tailed}) < 0.025$) higher on surprising than on unsurprising mentation.

In the second experiment, the effects on the percipient of two agent 'strategies' were compared. In the 'Hoping' condition, agents concentrated upon hoping for the percipient's success; in the 'Experiencing' condition, agents tried to experience the scene depicted in the target as realistically, and in as many modalities as possible. Overall, scoring was non-significantly below chance. Although more percipients experienced, as predicted, more mentation which was unstructured and irrational during the 'Hoping' strategy, the difference was not significant. Scoring did not differ significantly between the two conditions and there was no indication that percipients experienced imagery in the same sensory modalities as the agents when the agents employed such imagery. Both percipient and agent psychological measures were subjected post-hoc to factor analysis. For one independent judge there was a significant ($p(\text{two-tailed}) < 0.01$) negative correlation between ESP Z-scores and a factor composed of the percipients' good mood, pleasantness of ganzfeld experience, and post-ganzfeld relaxation. For the other judge, a factor representing in the 'Hoping' condition, the agents' enjoyment of the strategy, time spent hoping for success, and high motivation, correlated positively with ESP Z-scores ($p(\text{two-tailed}) < 0.05$). One judge was able, to a significant degree ($p(\text{one-tailed}) < 0.05$) to identify successful trials. Scoring on fleeting mentation, according to a post-hoc two-tailed test, was significantly worse than on non-fleeting mentation ($p < 0.02$), according to one judge's data.

In the third study, the present author acted as independent judge for data from another ganzfeld study, in order to investigate ways of improving scoring by means of identifying target-related mentation before feedback. Overall, scoring was non-significantly above chance. None of the various types of picture-mentation correspondence examined (literal, formal, conceptual, associative) proved more accurate than any other, nor did any particular kind of mentation yield better scoring than the rest. No significant difference was found between scoring on the basis of weak and of strong correspondence ratings. There was some indication that the occurrence of spectacular matches between individual mentation items and a single picture, and of the occurrence of an unusually high overall match between one picture and the mentation, was a useful basis for making trial-by-trial confidence calls, and that the occurrence of unusually good

matches to more than one picture in the target set indicated the occurrence of displacement, although none of these results was significant.

Although a number of significant findings were obtained, these must be regarded as inconclusive in the context of the large number of analyses performed. However, some progress was made in establishing which lines of research most merit future investigation.

The question of displacement, both in a free-response and a forced-choice setting, has received extensive, but mostly casual attention over the last forty years. Accordingly, a review of the displacement literature is given, with an account of matters of analysis which are necessary considerations for the interpretation of apparent displacement effects. It was concluded that there is far less evidence for displacement as an established phenomenon than has been assumed to be the case, but that this lack of evidence could be attributable to the use of ambiguous analyses and a lack of systematic research, rather than to the non-existence of displacement. Specific suggestions for a more productive research strategy are proposed.

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Declaration

This thesis has been composed by myself and the work is my own.

Julie Milton

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CHAPTER 1

INTRODUCTION

J.B. Rhine's term, 'extrasensory perception', or 'ESP', may be defined as the "acquisition of information about an external event, object or influence (mental or physical, past, present or future) otherwise than through any of the known sensory channels" (Thalbourne, 1981). Rhine used the term to embrace phenomena which included 'telepathy' and 'clairvoyance', which refer to the paranormal (that is, inexplicable in terms of known physical laws) acquisition of information concerning the thoughts, feelings or activity of another conscious being, and of information concerning an object or contemporary physical event, respectively. Because of the difficulty in excluding the possibility of clairvoyance of the other person's brain state, or of some aspect of the test procedure which could identify the ESP target when telepathy is supposedly being tested, however, the term 'general extrasensory perception', or 'GESP', is commonly used to refer to a situation in which another person has knowledge of the target. Another term which appears in the thesis and which requires definition, is 'psi', which is used in parapsychology as a general term to refer to an organism's extrasensorimotor interaction with the environment, and includes both ESP and 'psychokinesis' ('PK'), which is the influence of the organism on the environment without known means.

As Beloff (1977) has pointed out, the use of the word 'perception' in 'extrasensory perception' is unfortunate, since the definition of the term does not commit the user to a model of ESP which necessarily involves perceptual processes. Another problem of terminology has been noted by Palmer (1980), who sees the assumption of a paradigm in which ESP involves the transmission of information across some kind of channel from

a source to a receiver as being implicit in the use of such terms as 'extrasensory perception', 'clairvoyance', and 'remote viewing'. It should be stressed that the present author has not assumed a transmission model of ESP and that the use of the traditional terminology in this thesis should not be taken to imply the acceptance of such a model.

This dissertation reports the results of three experiments attempting to examine the relationship between ESP and a number of psychological and situational variables, and includes a review of research relating to correlates of ESP 'displacement', which is the apparent tendency to respond to an experimental target which is not the intended target for that trial. Since the existence of ESP is still considered to be controversial, some justification would seem to be required for the use of a process-oriented approach to a phenomenon which might or might not exist, as opposed to work simply aimed at demonstrating the reality of ESP.

Probably the main reason for doubting the validity of the ESP hypothesis is the lack of a 'repeatable' experiment in parapsychology. However, as Palmer (1978) points out, although replicability in parapsychology is far from perfect, it does not seem to be the case that there is no replicability at all, especially when the experimental literature is considered in terms of patterns of findings relating ESP scoring to other variables, rather than of the simple measure of overall scoring on an ESP task. In addition, Palmer notes several possible reasons for a less-than-perfect replicability rate, pointing out that it seems reasonable to expect parapsychology, like any behavioural science, to be probabilistic, rather than absolute in its degree of replicability. Also, if the ESP hypothesis is valid, but the effect is a weak one, then tests of the hypothesis would not be expected to yield highly replicable results, because of sampling variability. Even if there were as yet no signs of replicability,

however, there would still be a strong argument in favour of process-oriented research. Palmer further states out that another reason why parapsychology has a relatively low replication rate could be because as yet, it is not known which are the crucial elements of any experiment which need to be held constant in replication attempts; and, presumably, the only way to discover which are these elements is to do process-oriented research. If ESP does not exist, such research will not yield results. If ESP does exist, albeit as a weak effect, then such research should suggest methods of improving the replicability of experimentation. For example, the effect which is perhaps considered to be among the best-established in parapsychology is the so-called 'sheep-goat' effect (Palmer, 1978), in which subjects who believe ESP to be possible under the conditions of the experiment score above chance (psi-hit) while subjects who do not believe ESP to be possible score below chance (psi-miss); if an experiment was designed as an attempt to test the ESP hypothesis in terms of whether overall scoring deviated significantly from chance without regard to the characteristics of the subject population, then if the subjects tested included a roughly equal mix of positively-scoring sheep, and negatively-scoring goats, the overall score would be approximately at chance level. If, however, the experimenter decided to compare the scores of sheep with those of goats, and discovered the difference between the two groups, then in future research the sheep and goats could be tested as separate populations, and their scores would be more likely to show statistically discernible effects, being directionally consistent. This principle could be applied to any finding which identified a variable which allowed the separation of high- and low- (or negatively-) scoring groups.

The second chapter in this dissertation is an attempt to review the literature of process-oriented research carried out on displacement, and

assess whether such research has suggested measures which could help to make this particular problem area more tractable. Displacement is a problem principally from two points of view. Firstly, evidence for the existence of displacement as a phenomenon has appeared largely in the context of studies involving post-hoc and multiple analysis, with little or no examination for the sort of artefacts which can give rise to the semblance of displacement when only target-related effects exist; also, since in the majority of the literature displacement has often been analysed only as an afterthought, the danger of only mentioning those casual analyses which turned out significant is very real. Since it is therefore difficult to assess the evidence for displacement in terms of the number of studies publishing statistically significant displacement scores, a more useful strategy would seem to be that of examining the literature for consistency in the relationships of other variables to displaced scoring; consistent findings would be suggestive as evidence for the existence of displacement and could themselves be used to produce more replicable results by means of the 'boot-strapping' process described above. The second respect in which displacement is problematic is that researchers in recent years have tended to regard displacement as something which messes up experiments. Experimental analyses are generally planned in terms of testing for relationships between scoring on the intended target and other variables, and displacement, unlike psi-missing, is not represented in a measure of scoring on the intended target, except to the extent that the two scores may be linked, either truly or artefactually. Palmer (1978) has gone so far as to suggest that displacement is one of the greatest impediments to demonstrating ESP reliably. If displacement really does exist and is so very troublesome, then a review which may indicate likely causes of displacement, or which may throw some light on the possible relationship

between the pattern of correlates of scoring on the intended and displaced targets, should be useful in suggesting ways of preventing displacement or of developing analyses which can cope with displacement when it appears unexpectedly. Surprisingly, no detailed review of the displacement literature has ever appeared, despite the existence of a sizable body of research initiated in the early 1940's, and it is hoped that the survey presented here will usefully fill the gap.

The three experimental chapters in this thesis, which appear as chapters 3, 4, and 5, respectively, all involved the use of a free-response methodology in which subjects were required on each trial to report their mentation (thoughts, feelings, imagery) for a period during which the supposed ESP target, a randomly-chosen picture whose identity was unknown to the subject, was displayed in a distant room. At the end of each trial, the subject was presented with four contrasting pictures, one of which was a duplicate of the target; the subject's task was then to place the four pictures (the judging set) in rank order of their correspondence to his or her mentation report. Since the target was always chosen at random from among the four possible alternatives, and since many such judging sets were used, in statistical terms the situation can be thought of as a forced-choice task with a baseline chance probability of correctly identifying the target of one in four.

All three experiments were run using the ganzfeld technique, a sensory habituation procedure thought to be psi-conducive, which is discussed below. The first two experiments were run by the author, but the third involved the author as an independent judge of the correspondence between each subject's mentation report and the pictures in the judging set for each trial in a study by Dr. Deborah Delanoy. All three experiments were performed using the ganzfeld technique. The term 'ganzfeld' was

originally used in psychology to refer to a homogeneous, unpatterned visual field (from the German ganz; 'whole', and feld; 'field'), typically achieved experimentally by placing halves of ping-pong balls over the subject's eyes with a uniform light-source in front of his or her face. The ganzfeld has been found to result in the subject seeing a diffuse light, with occasional periods of 'black-out', during which visual experience seems to disappear altogether (Avant, 1965). This 'black-out' experience has been related to a similar phenomenon observed in studies of stabilised retinal imagery (Lehmann, Beeler and Fender, 1967), and is interpreted as suggesting a functional similarity between continuous, unpatterned visual input and no input at all. Bertini, Lewis and Witkin (1972) went on to use both a visual and auditory ganzfeld in an attempt to elicit hypnagogic imagery; the auditory ganzfeld consisted of playing 'white noise' through headphones to the subject. White noise is composed of a random (in terms of temporal onset and amplitude) mixture of tones of all audible frequencies which sounds rather like radio static, or the roar of a waterfall. The subject was instructed to report out loud his or her thoughts, imagery, and feelings during the period of ganzfeld stimulation, and the experimenters concluded that the procedure was conducive to evoking a flow of imagery and ideation. The procedure used by Bertini et al has since been adopted by most parapsychologists using the technique, beginning with Honorton and Harper (1974), who felt that the experimental production of hypnagogic imagery could promote the appearance of ESP in the laboratory, because of the similarity of the hypnagogic state in a number of respects to certain 'altered' states of consciousness traditionally associated with spontaneous psychic experiences, and with practises purported to develop psychic powers. Among those factors common to these altered states which Honorton and Harper thought might be psi-conducive were the withdrawal

of attention from external sensory and somatic stimuli which might mask any weak psi input, and a concomitant directing of attention to internally-generated ideations which Tyrrell (1946) suggested may be 'mediating vehicles' for encoding psi information.

The technique has been used in over 70 published studies to date, and a high rate of replication has been claimed for it (Honorton, 1977, 1978; Sargent, 1980; Blackmore, 1980) of approximately 50% of ganzfeld studies yielding results significant at the 0.05 probability level. Since the completion of the experimental work in this thesis, criticisms of the validity of this figure have led to some reassessment, with Honorton (1985) claiming a replication rate of 43%, and Hyman (1985) claiming a rate consistent with chance. A detailed review of the replication-rate controversy can be found in Delanoy (1986). However, if the ganzfeld really is psi-conducive, it is possible that at least part of the reason for the technique's apparent success is not so much its altered state aspects, but that it involves the use of a free-response, rather than a forced-choice methodology; studies using other 'altered' state techniques, such as those involving hypnosis, dreams, relaxation and meditation, have also tended to use free-response methodologies and also have high replication rates claimed for them which are comparable to that of the ganzfeld (Honorton, 1977; Mishlove, 1983). Honorton compared the amount of psi information conveyed per trial in forced-choice and free-response tasks within the hypnosis literature, and found that free-response studies yielded a 'psi-quotient' (defined as $1000z^2/n$, where n is the number of trials) an order of magnitude higher than that of the forced-choice studies ($p<0.001$), and concluded that ESP is more frequently mediated through spontaneous mentation. However, the two types of task are difficult to compare in this situation, because although the psi-quotient is a measure of information

rate, or, more accurately, of statistical efficiency, it must be borne in mind that while most forced-choice guessing trials last a few seconds, free-response trials are likely to last anything up to half an hour, or even longer. Thus, if information rate was conceptualised as information per unit of time, rather than information per trial, the relative efficacy of the two procedures might appear to be more equal; on the other hand, the fact that the chance baseline probabilities in free-response and forced-choice tasks are approximately the same means that the free-response technique may not be being tested in a way sufficiently statistically sensitive to demonstrate any real superiority over the forced-choice method, even if such a superiority exists.

Nevertheless, the ganzfeld offers advantages other than an apparently high replicability rate. Because the ganzfeld seems to produce imagery similar to that self-induced by those who claim to be gifted psychics, or by those reporting spontaneous experiences, it provides an experimental context within which to examine ESP which is more similar to life outside the laboratory than other techniques. Another reason for using the ganzfeld, which is by no means trivial, is that all of the participants, subjects and experimenters alike, tend to find the procedure interesting and enjoyable, to the extent that people often volunteer themselves as subjects without being asked and without even knowing if an experiment is currently in progress.

A variety of aspects of ESP were investigated in the experiments reported. Those aspects investigated in two or more of the studies are discussed initially in the following sections of this introductory chapter, with discussion of those points related specifically to each study appearing in the introductory section of the appropriate study. An exception to this general rule is the topic of displacement, which is discussed at length in

the second chapter of the thesis. The topics discussed here are the role of the 'agent' or 'sender' in GESP; the efficacy of certain types of mentation in identifying the ESP target; the possible application of information theoretic concepts to a free-response methodology such as that employed here; and the effect of a subject's liking for the pictures in the judging set upon his or her ability to judge the correspondence between the pictures and his or her mentation without bias.

1.1. Role of the Agent

In parapsychological terms, the person who acquires information by paranormal means is referred to as the 'percipient', while the person who, in an experiment, has knowledge of the experimental target and tries to convey that information to the percipient, is known as the 'agent'; in spontaneous cases of ESP, the agent is the person about whose situation the percipient acquires information.

Traditionally, questions concerning the role of the agent have centred on whether the presence of an agent improves scoring in comparison to when no agent is present. The early psychical researchers had concentrated their efforts on investigating telepathy (Myers, 1903/1975), but J.B. Rhine's (1934/1973) successful results obtained in a procedure involving no agent led to an interest in comparing performance under the two procedures.

Palmer (1978), reviewing experiments which have involved a comparison of scoring with and without an agent in which the subjects have been blind as to which condition was operating, pointed out that while significant differences between clairvoyance and GESP scores have been observed in several such studies with a slight trend towards observing superior scoring under GESP than clairvoyance conditions, the differences

have not always been consistent in direction and some of the studies favouring GESP had weaknesses in design or in the reporting of results which make it difficult to draw firm conclusions from them. Carpenter (1977) suggests that although an agent may not be necessary for scoring effects to occur, contrasting an agent with another condition may result in differences in performance; both reviewers point out that the 'gifted' subject Lalsingh Harribance scored significantly above chance on GESP trials, but close to chance on clairvoyance trials when the two types of run were alternated while being under the impression that all the runs were GESP runs (Klein, 1972), but scored comparably well under clairvoyant conditions when this procedure was used exclusively and when he knew that the runs were clairvoyant (e.g., Roll and Klein, 1972).

The other main area of research into factors relating to the agent has concerned the social or familial relationship of the agent and percipient, again with conflicting results, but a general trend suggesting that the use of agents well-known or liked by the percipients tends to yield better results than the use of agents who are neither (Palmer, 1978). Apart from these two areas of research, however, surprisingly little work has been done to investigate the role of the agent, who in many ways seems to have been regarded as merely serving a kind of directive function for the percipient's ESP. This attitude is perhaps most apparent in the relative frequency with which agents and percipients are given psychological questionnaires in GESP experiments. In the 18 ganzfeld studies published up to 1982 (when the experimental work for this thesis began) in which participants were given psychological state questionnaires, only one required the agent to complete a questionnaire to examine the relationship between the agent's attitude and scoring (Parker, Millar and Beloff, 1977). This would seem to indicate either that most experimenters assume that the agent will fulfill his

or her role equally well regardless of his or her state of mind, or that the contribution of the agent's psychology will be minor in comparison to that of the percipient.

However, there are some suggestions from the literature concerning those aspects of the agent's psychological state which might be associated with success. White (1976a) has pointed out that the early researchers felt that there were two parts to the agent's role, namely, concentration upon the target, and the wish to convey the information to the percipient. She cites Schmoll (1887):

> The agents gazed uninterruptedly at the object, and concentrated their whole will on the desire to make a mental impression on the percipient.

and Thaw (1892):

> ...the only important function of the agent being that he should use his mind and his senses to the utmost capacity and at the same time try to impress the percipient with the idea.

However, other researchers have suggested on a similarly anecdotal basis that rigid concentration on the part of the agent may be counterproductive, and that better results may be obtained when some of the agent's attention is turned to other matters (e.g., Stanford, 1973; Warcollier, 1938; Osty, 1923). Interestingly, Van de Castle (1970) found post-hoc that, while acting as experimenter/agent in a series of ESP tests with Cuna Indians, scoring on those runs for which he felt his concentration had been good was significantly below chance ($p<0.007$), and when he had been distracted scoring was significantly above chance ($p<0.02$), the difference between the two scores being significant ($p<0.0004$). Thus, a very high degree of concentration may be detrimental to scoring, perhaps particularly if the

effort to concentrate is stressful. The apparent conflict between the various anecdotal descriptions of the effect of concentration upon performance may result from a lack of specificity about the type of concentration under discussion. If the concentration involves a relaxed and enjoyable absorption in the task in hand, rather than effortful striving, more positive results may be obtained.

A small number of studies have been conducted in which it was planned to examine scoring in relation to the psychological state of the agent or experimenter remaining with the target during a clairvoyance session (the influence of other experimental personnel, such as those who prepare targets or check responses, has also been the subject of attention; the reader is directed to reviews on this topic by White (1976a) and, more recently, Weiner (1985)). Osis, Turner and Carlson (1971) found that in two studies, the mood of the experimenter who laid out and remained with an array of targets during the experimental session seemed to affect the subjects' performance, even although the task was a clairvoyant one. In each of the studies, scoring was examined in terms of the degree of psi-hitting and psi-missing on the intended target, on the target preceding the intended target in the array (backward displacement), and on the target following the intended target in the array (forward displacement). In the first study, only the experimenter's mood was measured, and his mood was related significantly positively with psi-missing on backward displacement ($p(\text{two-tailed}) < 0.001$). In the second study, the experimenter rated four aspects of his mood, namely, his degree of relaxation, elation, vitality, and freedom from anxiety. Relaxation was related significantly negatively to the degree of psi-missing on the intended target ($p(\text{two-tailed}) < 0.01$); elation was related significantly positively to psi-hitting on the intended target ($p(\text{two-tailed}) < 0.03$), and to psi-missing on backward displacement

(p(two-tailed)<0.03); and freedom from anxiety was related significantly negatively to psi-missing (p(two-tailed)<0.03) and positively to psi-hitting (p(two-tailed)<0.05) on backward displacements. A stepwise multiple regression analysis was used to analyse the results, and, as Osis et al point out, it is possible that some of the psychological measures and the ESP measures were intercorrelated to some degree, and so some spurious results may have arisen.

Osis and Carlson (1972) ran three clairvoyance experiments in which two experimenters sat with the same array of targets during the session. The percipients had been informed of the presence of one of the experimenters, but not of the other. Both experimenters rated their moods during the session, and ESP scores were found to correlate mostly with the mood of the unknown experimenter. For the unknown experimenter, relaxation correlated significantly negatively with psi-missing on the intended target in the first study (p(two-tailed)<0.05), and positively with psi-missing on forward displacement in the second and third studies (p(two-tailed)<0.01); elation correlated significantly negatively with psi-hitting on forward displacement in the first study (p(two-tailed)<0.05), and positively with forward displacement psi-missing in the second study (p<0.05); vitality correlated significantly positively with psi-hitting on forward displacement in the third study (p(two-tailed)<0.01), and freedom from anxiety correlated significantly positively with psi-missing on forward displacement in the second study (p(two-tailed)<0.05). For the experimenter who was known to the percipients, the only significant correlation between mood and ESP scores was a negative correlation between elation and psi-hitting on forward displacement. Again, the experimenters pointed out that caution should be applied in interpreting the results because of the probable intercorrelation of some of the variables.

The results of Osis, Turner and Carlson, and of Osis and Carlson are difficult to interpret in terms of assessing which aspects of the agent's mood might be generally associated with success, because most of the correlations reported were with displaced scoring, and it is an open question as to whether psychological variables correlate in the same way with displaced scoring as with scoring on the intended target. Nevertheless, they do seem to indicate that an examination of the relationship of the agent's psychological state to performance may prove rewarding.

In a ganzfeld GESP experiment, Parker, Millar and Beloff (1977) had the agent rate his or her expectancy of success and mood. Overall, ESP scores were close to chance, and none of the variables studied showed any significant relationship with performance, including the variables relating to the agent. However, the lack of significant relationships may simply have reflected a lack of ESP in the study, and so it should not be concluded that the agent's attitude has in general no relation to scoring.

Given that so little seems to be known as yet about how the agent's state relates to ESP performance, the first two experiments in the thesis both involved an investigation of the effects of various aspects of the agent's psychological state, such as degree of concentration upon the target, motivation, and interestedness, upon the percipient's performance. The first study also examined in what, if any, respect the agent might serve a kind of 'landmark' function for the percipient, in terms of focusing the percipient's attention upon the intended target for the trial, and in preventing displacement, while the second experiment contrasted two 'strategies' by means of which the agent attempted to convey the identity of the target to the percipient, in order to examine whether differences in the agent's activity affected the structuredness of the mentation and

modality of the imagery experienced. These aspects of the two experiments, which were specific to each, will be dealt with in the introductory sections of the relevant chapters.

1.2. Mentation Categories

In all three of the experimental studies which appear in this thesis, an attempt was made to discover whether certain types of ganzfeld mentation, distinguished by the nature of their content (such as whether they were bizarre, or memory-related) or by their experiential qualities (such as whether they appeared fleetingly, vividly or recurrently), tended to be especially associated with information identifying the ESP target. The relationship between imagery in particular (defined by Richardson (1969) as follows: "Mental imagery refers to all those... quasi-perceptual experiences... which exist for us in the absence of those stimulus conditions that are known to produce their genuine sensory or perceptual counterparts, and which may be expected to have different consequences from their sensory or perceptual counterparts." (p.2-3)) and ESP has been of interest to parapsychologists for a number of reasons. Firstly, a wide range of magical and religious traditions which purport to involve psychic powers also involve the production or experience of vivid imagery; George (1981) gives the following examples:

> ...the shamans of technologically unsophisticated cultures routinely engage in vivid journeys into the "spirit world" in order to foretell the future and obtain cures for illnesses (Eliade, 1966). The Vajrayana tradition of Buddhism, which has produced many reports of the (incidental) acquistion of paranormal abilities as one progresses on the path to Buddhahood, involves arduous training to produce sustained and complicated visualisations (Govinda, 1960). In the culture of the West, the effective practise of traditional ceremonial magic purportedly depended on the ability of the adept to visualise travels on the "astral plane", and to envisage him/herself as the personification of a particular deity at the height of the magic ritual (Regardie, 1969, 1970).

> The contemporary popular occult literature also emphasizes the necessity of vivid visualisation for magical efficacy (Morris, 1977).

Mishlove's (1983) account of various systems which claim to develop psychic powers includes many more examples of the use of techniques effective in developing imagery skills within such systems. However, Kelly and Locke (1981) have suggested that the imagery produced in some of these situations may seem to be psi-conducive largely because of "...its impressive phenomenology, which readily suggests to naive practitioners a supernatural origin for their visions." (p.223).

Another suggestion that ESP and imagery might be linked comes from surveys of spontaneous cases. Reviewing a number of such surveys taken in a number of countries, George (1981) shows that most such surveys reveal that between roughly 60% to 80% of spontaneous reports of ESP involved an imagery experience (such as a dream or hallucination), as opposed to intuition. As George points out, however, in order to assess whether cases of apparent spontaneous psi tend to be associated with imagery experiences, the proportions given above would need to be compared with the proportion of non-psi experiences which are imagery-based, and such figures are not available. He cites a study relevant to this point which has been carried out by Irwin (1979), in which a group of college students completed a questionnaire on their spontaneous ESP experiences, which were classified as either predominantly visual or verbal. In another context and at a later time, the same students were required to complete Paivio's (1971) Individual Differences Questionnaire, which assesses to what extent a person relies on verbal processing and imagery processing in everyday life. Irwin found a significant ($p<0.01$) interaction between the predominant mode of psi experience and the

predominant mode of processing, due to reports of 'visual' psi experiences occurring among those whose normal style of processing was predominantly visual. This result would seem to suggest that the large proportion of spontaneous cases involving imagery may be due to the distribution of people who experience imagery in the population, rather than an association of imagery with psi.

A possible theoretical link between psi and imagery was put forward by Tyrrell (1943), who suggested that the ESP process occurred in two stages, the first being the paranormal acquisition of information by the unconscious mind of the percipient, and the second being the passage of the information to the conscious mind. He proposed that imagery was one possible means by which psi information could be mediated from the unconscious to consciousness, drawing on the literature of dreams, reveries and hallucination which seem to indicate that imagery is an important channel of unconscious information.

The approach taken by most parapsychologists interested in the question of imagery has been to compare the ESP performance of those people who experience vivid imagery with that of those who do not, to compare groups of subjects instructed to use or not to use imagery, or to compare ESP performance of subjects before and after they have received imagery training; the common thread running through these various efforts would seem to be the hypothesis that the more imagery, and the more vivid the imagery experienced by the subjects, the better they are likely to perform on an ESP task. So far, research conducted in these areas has yielded inconsistent results (George, 1981).

It is possible that it is not the ability to produce imagery well which is important for psychic functioning, but some accompanying feature of imagery production. For example, the act of paying attention to imagery

may be associated with a different kind of psychological functioning from usual (a supposition related to the widespread use of 'altered state' techniques in parapsychology, as discussed earlier), or the experience of ideation as imagery may reveal features of mental experience which can be used to distinguish psi-related thoughts from those which are not. Concerning this latter possibility, it seems reasonable to suppose that within one person's imagery experience, certain categories of mentation may tend to be more successful than others, depending upon both their likely origin and their route to consciousness which may determine the degree and type of distortions they undergo. Some clues as to which mentations are most likely to be psi-related can be found in anecdotal, experimental, and theoretical sources.

White (1964) reviewed anecdotal accounts from 'gifted' psychics and their experimenters of how they made their responses when attempting to guess a hidden target. The kind of imagery experienced by many of the psychics appears to have been very similar to hypnagogic imagery (Mavromatis, 1986), which makes their comments particularly relevant here. The accounts included the psychics' assertions of which particular images were likely to be correct. Several agreed that images which were particularly vivid, spontaneous, or accompanied by a feeling of certainty, were most likely to be accurate; others had individual criteria of success, such as the persistence or recurrence of an image, or its instantaneous appearance, or fleeting quality. Some of these criteria seem to have been specific to the way in which the percipients experienced their imagery, such as Mrs. Carlson (White, 1964):

> ...a stage was reached in which the lines of the drawings were perceived "in light." That is, the lines appeared to be somewhat like the way lightning might look if it stood still. The nearest analogy would be electric signs, although these

> lines appeared to be of greater intensity than the light of electric bulbs. When the lines or shapes or images were perceived in this manner, they were always correct. When the lines were dark and shadowy, they were often only partially correct... (p.38-39).

Schlitz (1984), reporting on a recent meeting of apparently successful percipients and researchers, also noted patterns across individuals of which categories of mentation they considered to carry psi information. Many felt that imagery which was fleeting, novel, or recurring was likely to be successful, and that kinaesthetic, auditory, and olfactory images were of equal or greater importance compared to visual imagery.

Very few experimental studies have attempted to compare the success of particular mentation categories with others within each subject's mentation. Sargent, Bartlett and Moss (1982) had their subjects in a ganzfeld GESP study make a note of which of their responses had been especially clear or strong, and which had been unusual:

> Our definition of such a[n unusual] response was "anything that you were surprised to think of or experience," and we suggested that this might reflect unusual content (e.g., "an inflatable purple pig") or unusual/inappropriate context (e.g., "a man playing the piano atop a veal and ham pie"). Neither element in the latter example is particularly rare, but the context of the piano playing is bizarre. (p.90).

Each response in the subject's mentation transcript was given a numerical rating for its correspondence to each of the four pictures in the judging set, one of which was a duplicate of that viewed by the agent during the session. The percentage of the total correspondence rating points allocated to the target on the basis of 'unusual' responses was compared to the percentage allocated on the basis of those not so labeled; a similar analysis was made to compare responses noted as being 'clear' and those which were not. According to both the subjects, and to an independent judge of

the correspondence between pictures and mentation reports, scoring was higher on the 'unusual' responses than the rest, although not significantly so.

Sargent et al had planned the comparison of unusual responses with the remainder in the context of Stanford's (1967) response-bias hypothesis, which proposes that there should be an inverse relationship between the 'bias strength' or likelihood of a response and the probability that it carries psi-related information; Stanford suggests that a low bias (rare) response will seldom be given in the absence of an ESP 'signal', but that if such a signal is present, the resulting internal pressure will overcome the subject's reluctance to make the response. Thus, the probability that a response carries some psi-related information should increase, the less frequently the response is usually made. However, it seems questionable whether 'unusual' responses as defined by Sargent et al are truly low-bias responses in this sense, given that they occur in the ganzfeld, where bizarre and surprising imagery may be precisely the kind of imagery subjects are predisposed to report, while ignoring more mundane imagery which they might assume not to be related to the experiment; indeed, some subjects might experience only bizarre and surprising imagery in the ganzfeld and nothing else. Comments reported from some of the subjects with previous experience of the ganzfeld seem to support both of these suggestions; naive subjects showed a stronger difference in scoring between unusual and other imagery than did experienced subjects, and Sargent et al interpreted this as weak support for Stanford's hypothesis, since the naive subjects seemed to have reported all of their imagery and would therefore be expected to show a clearer response-bias effect than the experienced subjects who did not report all their imagery. However, it would seem that a useful distinction could be made between a response which is rare

because those constituents which compose it rarely come together, and a response which is rare because a subject has an active bias against it; thus, a ganzfeld percipient might rarely describe an image of an inflatable purple pig because that particular combination of elements rarely came together in his or her mentation, rather than because of any bias against thinking about or mentioning inflatable purple pigs when they occurred; it is arguable that only in the latter case would Stanford's response-bias hypothesis be applicable.

In the comparison of scoring on clear and unclear images, although experienced subjects scored non-significantly higher on clear than on unclear images, naive subjects scored significantly worse on clear images than unclear images ($p(\text{two-tailed}) < 0.02$), scoring non-significantly below chance on clear images, and non-significantly above chance on unclear images to an approximately equal degree, although Sargent et al point out that since the comparison of results of naive and experienced subjects was post-hoc, no significance can truly be claimed for the result.

In a second, unpublished ganzfeld study, Sargent, Moss and Bartlett (1982) asked the subjects, who all had previous experience of the ganzfeld, to indicate which responses were particularly clear, those which had been bizarre or surprising (low-bias responses) and in addition, those recognisable as relating to recent memory or which were images or thoughts which habitually occurred in the ganzfeld (high-bias responses). Scores were non-significantly higher on clear than unclear imagery ($0.10 > p > 0.05$), and significantly higher on low-bias than on high-bias responses ($p < 0.01$). In a third, similar study by Sargent, Milton, Payne and Bennet (1982, also unpublished), scoring on low-bias responses was non-significantly higher than on high-bias responses ($p > 0.10$), and scoring on clear imagery was non-significantly higher than on unclear imagery

($p > 0.10$). However, the same reservations concerning the interpretation of 'unusual' response as low-bias and memory or habitual responses as high-bias in Stanford's sense would also seem to apply to these two studies; also, it has been suggested that memory responses may be particularly psi-related (as discussed below), and so the categorisation of memory responses as high-bias may well have been unadvisable.

Other indicators of the categories of imagery which might be expected to be particularly psi-related are found in a number of theoretical sources. Roll (1966) has suggested that ESP responses may consist of revived memory traces, rather than involving the perception of the ESP target, and that an alternative term for 'extrasensory perception' might be 'extrasensory remembering'. He points out that the events most likely to be remembered are those which are recent; those which happen frequently; and those which are vivid or emotionally intense. He proposes that, if the memory theory of ESP is correct, then ESP responses should be expressed in terms of memory traces of recent, frequent, or vivid events, since these are the more easily re-activated. One might argue, on the other hand that other memory traces might be activated in preference to these generally more readily available ones if they corresponded to the ESP target especially well; or that apparently novel mentation could result from the activation of pre-existing memory traces in a novel combination, a process which has been suggested to occur in ordinary perceptual processing (e.g., Neisser, 1976; Kosslyn and Pomerantz, 1977; Morris and Hampson, 1983). It should be possible to test this particular aspect of Roll's model by comparing performance on the basis of recognisably memory-based imagery and of apparently novel imagery, a comparison made in all three studies reported bere.

Another model which might be relevant to suggesting successful

mentation categories is Stanford's (1978) model of conformance behaviour. In this model, psi is regarded as organising disordered or random processes in accordance with the disposition of some organism which is concerned with the outcome of organising such processes. The more random and disorganised the target system, the more susceptible it is to psi influence. In the case of ESP, the brain is considered to be the random system which becomes ordered according to the percipient's (or experimenter's) disposition to produce responses which will match the ESP target.

If it is the case that ESP success is associated with relatively random and unstructured brain functioning, then mentations which reflect such a brain state should be particularly successful. Stanford (1979) makes a distinction between images which are associatively related to the previous image, and those which are not; the latter category would seem to reflect random brain functioning in the sense that such images are not sequentially related and that the probability of their occurence is not apparently determined by the preceding image. Scoring on the basis of related and unrelated imagery was therefore compared in experiments 1 and 3. Bizarre imagery composed of an unusual combination of elements might also be considered to be the product of random brain processes; scoring on the basis of bizarre imagery was compared with remaining imagery in experiments 2 and 3. Other imagery which might also be supposed to reflect random brain functioning were examined in experiment 3, such as images which interrupted an ongoing train of thought (noted by psychoanalysts Ehrenwald (1954) and Eisenbud (1948) as being especially psi-related in their patients' dreams), images containing some sort of discrepancy, and images in which a new element appears out of context. There is already some evidence to suggest that the experience of unrelated and bizarre imagery in the ganzfeld may be associated with success. In

two experiments, Sargent (1980, 1982) found that ESP scores correlated significantly positively with the degree to which subjects rated their session's mentation as "spontaneous, dreamlike, bizarre" as opposed to "rational, structured, directed", and Palmer, Bogart, Jones and Tart (1977) and Palmer, Khamashta and Israelson (1979) obtained consistent results in ESP score correlations upon which this same item loaded significantly. Stanford and Nelyon (1975) found that the percentage of time during which the percipient reported his or her thoughts to be "random and disconnected" correlated significantly positively with success.

Following the work of Sargent and his co-researchers, imagery which was surprising was examined in experiment 1, and imagery which was especially vivid examined in experiments 2 and 3. A number of categories of imagery characteristic of the hypnagogic state, itself supposedly psi-conducive as discussed above, were also investigated (such as imagery which was fleeting, or undeveloped to a point at which it would be recognisable, or which developed spontaneously), as were mentation categories suggested from anecdotal sources to be successful, as discussed earlier (such as persistent or recurrent imagery, or non-visual imagery). Full lists of the imagery categories examined in each experiment may be found in the relevant chapters.

1.3. Information Theory

Various approaches consistent with Information Theory (Shannon and Weaver, 1949) have been applied both to various areas of 'orthodox' psychology with some success, such as psychophysics, recognition memory, speech communication, sensory physiology, and subliminal perception (Green and Swets, 1966), and also to parapsychology in the form of repetitive calling, or majority-vote procedures (Ryzl, 1966; Brier and

Tyminski, 1970a, b; Carpenter, 1982), or by attempts to apply the related Theory of Signal Detection in psi experiments (Zenhausern, Stanford and Esposito, 1977; Mitchell, 1981; Stanford and Angelini, 1984); both West (1974) and Stanford (1974) advocated the exploration of applications of Signal Detection Theory to parapsychology, and Stanford (1982) also attempted to relate the theory's approach to work already done in the field, although the validity of applying this particular theory to ESP research in a forced-choice context has been questioned (Milton, 1985). The relevance of information theory to ESP research is that the theory deals with the transmission of signals through a noisy channel and lays foundations for approaching error-free transmission in such a channel by means of appropriate statistical averaging techniques (it should be noted here that the use of the term 'channel' does not presuppose a transmission model of ESP; it may apply equally well to the route which paranormally-acquired information takes through the percipient's brain on its way to expression as an overt response).

So far, information theoretic concepts in parapsychology have been applied almost exclusively to forced-choice experiments, although recently Spottiswoode (1983) has applied the theory to a series of free-response ESP studies in an attempt to increase reliability of performance, following suggestions from Puthoff and Targ (1976) and Targ and Puthoff (1977). In Spottiswoode's studies, percipients were asked to report their free-response mentation, and to encode it using a binary descriptor list. The mentation encoding was then matched by computer to the encodings of a small number of randomly-chosen objects, one of which was the target designated for that trial. If the degree of correspondence to any one of the objects exceeded a pre-specified criterion, then the trial would go forward and the identity of the target would be revealed. If no single object

corresponded sufficiently to the mentation for the criterion value to be reached, the trial would be abandoned. This situation may be viewed as being analagous to setting a criterion level for accepting the presence of a signal amidst noise; the higher the criterion, the more likely it is that a signal truly is present if that criterion is exceeded, rather than a random fluctuation in noise level. An attempt was made in one of the four experiments run by Spottiswoode to see if higher hit rates were achieved on those trials for which higher criteria were exceeded; unfortunately, problems concerning 'clustering' in the target pool (that is, the tendency for certain features of a target to occur together) invalidated the analysis, but the approach would, nevertheless, appear to be a potentially useful one. Although not explicitly investigating an information theoretic framework, Ashton, Dear, Harley and Sargent (1981) found post-hoc that for one of the four percipients, the average highest rating assigned to a picture in the judging set when the target was ranked first (average=91/100) was significantly higher than the average rating when the target was not ranked first (average=79) ($p(\text{two-tailed}) < 0.05$); that is, when there was a very good match with a picture in the judging set, that picture was generally the target, not one of the controls. Although a more direct test of the information theory approach would have been to have compared the ranks assigned to those trials on which the highest rating was exceptionally high, with scoring on those trials on which lower ratings were given, the finding of Ashton et al does yield some indirect support for an information theory approach.

As further tests of the information theory approach in free-response experiments, in Experiment Two of this thesis, the degree to which the most highly-rated target stood out above the others in the judging set in its correspondence to the percipient's mentation report was

examined in relation to scoring on the target; information theory would predict that higher target scores should be achieved on those trials on which one picture stood out well above the rest as compared to those trials on which all the pictures corresponded roughly equally to the mentation. In experiment 3, 'confidence calls' were made on those trials on which one picture stood out well above the rest in terms of its correspondence to the percipient's mentation, in an attempt to identify trials likely to be successful in advance of feedback.

1.4. Picture Preference

In all three experiments in the thesis, the question of whether a percipient's liking for the pictures in the judging set might affect his or her ability to judge the correspondence between mentation and pictures dispassionately was examined. The author's informal observations in previous experimentation suggested that subjects might be inclined to look harder for correspondences to pictures which they liked, while paying little attention to, or discounting correspondences to those which they did not like. If such a bias was present to any degree, it would tend to reduce any ESP scoring towards a chance level if there was only a chance likelihood that the picture which the percipient preferred was the target; the stronger the bias, the less likely a weak ESP effect would be to show up.

A number of studies have examined how the percipient's liking for the various pictures in the judging set has related to performance. Williams and Duke (1980), in a free-response experiment in which scoring was significantly above chance, had percipients place the pictures in the judging set in rank order of correspondence to their mentation, and in rank order of their liking for each picture. Percipients who liked the target did significantly better at ESP performance than subjects who did not like the

target. There could, however, be several possible causes of this result, namely, that percipients chose pictures as targets according to their liking for them; or that the percipients' liking for the pictures was partly determined by the degree to which the pictures corresponded to the mentation, which could itself have been related to success; or that pictures which were liked made effective targets (in the sense that when they were the target, they were chosen as the target, and when they were controls, they were not chosen as the target), which was the hypothesis of interest to Williams and Duke. Unfortunately, no attempt was made to distinguish between these options with respect to the percipients' liking ranks, although a control analysis was performed for a possibly related finding that subjects psi-hit on pictures rated by the experimenters as 'good' in terms of various qualities of content, and psi-missed on pictures rated as 'bad'. The 'good' pictures were found to be ranked more highly when serving as targets than when serving as controls ($p(\text{two-tailed}) < 0.0008$), indicating that liking for a 'good' picture was not likely to be a factor in causing it to be ranked highly independently of the likelihood that the trial would be successful.

In a ganzfeld experiment by Delanoy, Parker and Wilson (1981) the ratings of liking given to pictures which received high correspondence rankings were significantly higher than those which received low correspondence rankings ($p < 0.001$), possibly indicating a bias in judging, although a comparison of the preference ratings given to the target when it was ranked highly in terms of its correspondence to the mentation with when it was ranked low, showed no significant difference ($p > 0.10$), although this lack of significance might have been due to the relatively small sample size for this comparison.

In a ganzfeld GESP experiment by Sondow, Braud and Barker (1982), it was found that percipients ranked the picture which was the

target highly in terms of liking to a significant degree ($p(\text{two-tailed}) < 0.004$), and that those percipients who psi-hit ranked the target more highly on liking than those who psi-missed ($p(\text{two-tailed}) < 0.01$), which latter result could have been the product of bias. Interestingly, as Sondow et al pointed out, the percipients scored better on liking ranks than they did on correspondence ranks, and suggested that liking may be a measure of unconscious psi.

Thus, apart from possible counterproductive biases produced by liking for the pictures in the judging set, it seems also that those pictures which are liked may make effective targets in the sense that they will be selected by the percipient as targets when they are targets, but not when they are controls, and also that liking may be related either to the degree of correspondence to each picture, and hence to success, or may even be a better indicator of the target than measures of correspondence. Because of the use of independent judges in all three experiments in this thesis, who rated blind the correspondence between pictures in the judging set and the percipient's mentation report for each trial, some attempt was made to distinguish between these various factors, based on the assumption that experienced judges would be more able to give objective ratings of correspondence independent of their own liking for the pictures, especially since they would not, unlike the subjects, have just emerged from the rather disorienting and counter-logical experience of the ganzfeld. These issues are discussed further in the experimental chapters themselves.

1.5. Questions explored in the experiments

The topics discussed above, and some additional ones, were explored in the three experimental chapters in the thesis. Experiment One (Chapter Three) was principally concerned with examining the possible role

of the agent's attention in affecting target-related scoring and in contributing to the occurrence or prevention of displacement, and the relationship of a number of measures of the agent's psychological state to the percipient's ESP performance was investigated. A number of mentation categories were examined in relation to scoring, and various measures of the percipient's attitude towards the four pictures in the target set on each trial were examined to see if any seemed to determine to whch picture in the target set displacement might occur.

In Experiment Two (Chapter Four), the role of the agent was still of interest, but this time with an emphasis on the effect of the agent's activity upon the nature of the mentation experienced by the percipient during the ganzfeld. The relationship of psychological variables relating to both the percipient and the agent to scoring were of interest, as was an extended exploration of various mentation categories in relation to performance, and an investigation of whether a percipient's attitude towards the pictures in the target set might affect his or her ability to make objective correspondence judgements. The possibility that independent judges of the correspondence between the percipients' mentation reports and the target set pictures on each trial might be able to identify successful trials using criteria based on their own experience was also explored.

This latter question was followed up in a number of ways in Experiment Three (Chapter Five), in which the author acted as an independent judge of data from another experimenter's ganzfeld study, and examined what kind of correspondence (literal, formal, and so on) would best identify the target; which kinds of mentation would best identify the target; whether spectacular individual correspondences between mentation items and pictures in the set or overall correspondence ratings were better indicators of the target; whether successful trials could be identified by

high Z-scores, the occurrence of good matches between individual mentation items, or the style of the percipient's imagery during the session; whether the occurrence of displacement could be pinpointed by means of the pattern of scoring across the pictures in the target set; and whether the judge's liking for the pictures in the set affected her judgement of correspondence.

Full details of the specific hypotheses investigated ae contained in each chapter as appropriate. Preceding the experimental chapters, however, is the review of the displacement literature.

CHAPTER 2

REVIEW OF THE DISPLACEMENT LITERATURE

2.1. Introduction

The experimental work presented in this thesis which examines ESP displacement investigates within-trial displacement, that is, a situation in which the percipient appears to describe not the intended target picture but one of the control pictures for that trial; within-trial displacement was examined because, as discussed below, a free-response methodology has usually been associated with the occurrence of within-trial displacment. However, the more commonly investigated form of displacement in the past has been between-trial displacement in a forced-choice task. In between-trial displacement, the percipient identifies the target which follows (forward displacement) or precedes (backward displacement) by one or more trials the target for which the call was intended.

Within- and between-trial displacement are generally presented as different versions of the same basic phenomenon; at least, authors using the term 'displacement' for both have made no attempt to raise the issue of a possible difference between them. The difference between the two is that within-trial displacement involves the description of a picture which never has status as a target but which acts as a control comparison to the true target, while between-trial displacement involves the identification of an item which is a target but on a different trial from the one for which the response is intended. For the purposes of this review, and following the implicit use of the term 'displacement' in the literature, displacement is defined as occurring to some experimental material which could have been chosen as the target for the trial but was not, and thus has no status as a target on the trial in question. Although within-trial displacement cannot

occur in a forced-choice task since there are no alternative targets[1], between-trial displacement can occur in a series of free-response trials as well as in a forced-choice study, but such displacement rarely appears in the literature. This may indicate that such displacement is rare, or that it is more difficult to spot when it occurs; after all, free-response trials are often separated by as much as a day, and a considerable effort of memory would be required to notice a match between a complex response and a complex target over such a timespan.

Although Carpenter (1977) and Palmer (1978) have both included sections on displacement in their reviews of various aspects of ESP, no detailed, fully comprehensive review of the displacement literature has ever appeared, despite the fact that research on displacement spans the last half-century, and that over a hundred papers have been published which deal with some aspect of displacement. In addition to providing a context for the experimental work to be presented in later chapters, there are several reasons why such a review would be valuable. Not least is the reason that an account of the extensive work which has been done on displacement might suggest an alternative to the current 'pest-control' approach to displacement, which many researchers seem to take by regarding displacement as a nuisance rather than as a phenomenon of interest. Palmer (1978) has called displacement "one of the major barriers to the reliable application of psi"; other researchers, whose carefully-planned experiments have fallen unexpected prey to displacement, are usually less polite.

A reading of the earlier displacement literature gives the impression that the attitude of researchers to displacement has in the past been one of positive curiosity, rather than exasperation. This impression seems to be borne out by the fact that during the 1940s and 50s

approximately twice as many papers included an examination of the nature of displacement as during the 1960s and 1970s. At least part of this change in attitude may relate to the increasing number of researchers using free-response, rather than forced-choice methodology over the last twenty years. Between-trial displacement is less of a problem for experimenters than within-trial displacement; whereas between-trial displacement can be scored easily in a forced-choice experiment, statistical confirmation of within-trial or between-trial displacement in a free-response experiment involves more hard work for independent judges, who must compare the percipient's mentation report not only with all of the pictures in the target set, but also with another control set of pictures to check whether the percipient has described a non-target picture in the target set better than the pictures in the control set.

Even if one regards displacement as a curse, an understanding of its functioning should still be welcome, since it seems likely that displacement can be better prevented if its causes are known. In addition, like any nuisance, displacement may be an interesting phenomenon in its own right, and may provide some insights into the workings of psi. Weiner (1985) has discussed the relevance of displacement to the increasingly pressing issue of whether psi functioning has any limitations. This issue arose from work carried out during the mid 1970's (Kennedy and Taddonio, 1976; White, 1976a, b) which suggested that differences in scoring between groups of subjects in an experiment may at least in part be due to the psi influence of the experimenter. In addition, some support was gained for the notions that psi can be used without the conscious awareness of the person using it, and that psi may be 'goal oriented', that is, unaffected by the complexity of a task. A logical, and hard-to-test implication of such theorising taken to its extreme is that, if an experimenter could, all

unknowingly, affect the outcome of his or her own experiment no matter what obstacles of procedure were placed in the way, then process-oriented research would, quite simply, be a waste of time; experiments would just turn out the way the experimenter wanted or expected them to. In an attempt to provide a falsifiable test of this 'omnipotence' hypothesis, Weiner suggests that the discovery of unmotivated errors in psi functioning would indicate a point at which psi fails to be limitless in its capabilities, and examines displacement to see what sort of error it seems to be. In a similar vein, Spottiswoode (1983) has also sought to use displacement as a context within which to find limits for the possibilities of psi, this time within the framework of the Observational Theories. In his simplest scenario, Spottiswoode suggests that within-trial, free-response displacement could be due to the percipient's precognition of the wrong target in the judging set when the judging takes place. He argues that displacement could be eliminated if there were limits to the events which could be precognised. Such limits are proposed by the Observational Theories, which state that psi information flow is triggered by the observation of the outcome of a trial. If the other targets in the set are never observed by a person (by having the target set selection and judging done by a computer using binary coding of response and target features, for example), and the percipient is presented with only the real target, then there should be no displacement. Spottiswoode considers that this consequence for displacement of the Observational Theories is important because, if confirmed, it again sets boundary conditions on the operation of psi. Although such a possible falsification of the Observational Theories might be problematic because the exact nature of an observation is ill-defined, it may be possible in future to refine the Theories to a point at which the occurrence of displacement would be a key issue.

As well as contributing to such fundamental issues as the nature of psi, a review of displacement research could help both to suggest and answer questions which can be asked about displacement itself. Some reseachers have wanted to identify the psychological causes and correlates of displacement, while others have been more concerned with the relationship between displacement and scoring on the intended target. Research in both of these areas has been interpreted according to several, sometimes conflicting models of displacement, aspects of which have only occasionally been made explicit, and never discussed in the context of other aspects. The various qualities ascribed to displaced scoring seem, however, to fall into a number of internally consistent models with generally held suppositions. Although none of the models discussed below come from any one source, the construction of such models from the tacitly-held assumptions pervading the literature should provide a useful framework within which to consider the material under review.

In one model, displacement is regarded as evidence of ESP which was meant to be focused on the target but which was somehow misdirected. This model has been taken so much for granted by some researchers that they have used composite measures of psi which combine both target and displaced scores in a single measure (e.g., Thouless, 1942). According to this model, it would be expected that psychological variables which are usually related to scoring on the intended target should relate to displaced scoring in the same way; thus, those people who believe in psi would be expected to score above chance on the displaced target when their scores were displaced, because their scores on the intended target would normally be above chance. Another expectation which seems to be associated with this model is that scoring on displaced and intended targets should be mutually exclusive, since the percipient's psi is supposed

to be focused on only one target at a time; thus, a decline in scoring on the intended target would sometimes be accompanied by an increase in displaced scoring (when the decline was not due to other factors such as fatigue).

Other models have been concerned with the possibility of a relationship between displacement and psi-missing on the intended target. A number of authors, from Soal (1944) onwards, observing a certain degree of concomitance between displacement and psi-missing, have considered displacement as either a means of scoring below chance, or as resulting from the same psychological causes which can result in psi-missing and therefore sometimes accompanying it. It should be noted that various statistical artefacts, which will be discussed in detail below, can cause the association of psi-missing on the intended target with above-chance displaced scoring, when only one of the two is a real effect, and so the basis in fact of these models may be less well supported than might be supposed by the frequency of their occurrence in the literature (it should further be remarked here that the term 'psi-missing', as used in this review, refers to below-chance scoring, without necessarily carrying the implication of motivated error).

It may be relevant that displacement is not a very efficient way of psi-missing on the intended target, compared to suppression of information related to the target. An example of a way to use displacement as a means of psi-missing in a forced-choice task would be if the percipient tended to psi-hit on the (+1) target and also changed guess more often than chance; after scoring a (+1) hit, a change of call would necessarily produce a (0) miss, since the (+1) target on the previous trial would have become the (0) target for the next. However, a statistical expert would not consciously choose between-trial displacement as a means of psi-missing on the

intended target, since the same amount of information applied to the intended target would produce a larger effect, not being mediated by the probability of changing call.

The question of whether within-trial displacement directly results in apparent psi-missing in a free-response situation depends upon whether the percipient displaces to one control target or several, and whether the percipient describes the true target in addition to any of the controls. Except in the methodologically rare case in which there is only one control target in the judging set, displacement would again seem to be a rather inefficient method of psi-missing, although Thalbourne (1983) has argued that psi-missing via displacement would involve less cognitive effort than the alternative of avoiding the many images associated with the true target.

Thus it would seem that neither between- nor within-trial displacement are statistically efficient methods of psi-missing compared to the direct suppression of information relevant to the intended target. However, this fact is unlikely to influence statistically naive percipients, who probably assume the reverse, and may subconsciously choose to displace as a means of psi-missing on the intended target.

Both the models in which displacement is used as a means of psi-missing, and in which displacement shares the same causes with psi-missing, would involve the assumption that those psychological variables which are associated with psi-missing should associate with displacement in the same way. Alternatively, it may be that motivated psi-missing and displacement do not result from identical motives. Psi-missing is generally associated with a unconscious motivation to perform badly in an ESP task, for reasons which include disbelief in the existence of ESP, dislike of test conditions, and so on (e.g., Palmer, 1978; Carpenter, 1977). A percipient who is, however, generally well-disposed

towards the experiment but who wishes to avoid the target for some reason (such as boredom with the procedure, or distaste for the target) may choose to displace onto an alternative target. In this case, displaced scoring would not be expected to relate to psychological measures in the same way as psi-missing.

Although these models have been implicit in most displacement research, and rarely tested directly, they may provide a useful framework for the discussion of the material reviewed below. The review draws principally upon papers published between 1938 (when the first detailed paper dealing with displacement was published) and 1985 in Journal of the Society for Psychical Research, Proceedings of the Society for Psychical Research, Journal of the American Society for Psychical Research, Journal of Parapsychology, and European Journal of Parapsychology, although important papers from other sources will also be discussed where appropriate. The review is organised so that the between-trial literature is reviewed first, followed by a review of the within-trial literature; finally, both are discussed in terms of the various models of displacement outlined above.

2.2. Between-trial Displacement

2.2.1. Introduction

Throughout the review, the usual convention (introduced by Thouless, 1942)[2] of denoting between-trial, forward displacement to the first, second, and third (and so on) targets ahead of the present trial as (+1), (+2), and (+3) displacements respectively, and of denoting backward displacement to the first, second, and third targets before the present trial as (-1), (-2), and (-3) displacements, will be followed. Additionally, where convenient, performance on the intended target will be denoted (0)

displacement (following Pratt and Foster, 1950a).

Before embarking upon the review of the between-trial displacement literature, it is first necessary to discuss some statistical considerations which need to be taken into account when interpreting the results of any study which involves an analysis for between-trial displacement. The first such consideration concerns the appropriate method of calculating the probability of observing a given displacement score in a test using a closed deck; the second concerns artefacts which could give rise to apparent displacement when the only real effects involve the intended target, and which are also important in interpreting the relationships between scores on targets of different displacements.

In a test using an open deck, the probability of a displacement hit is the same as the probability of a hit on the intended target, assuming that both target and call sequences are random. For tests with closed decks, however, the number of hits on targets of different displacements are interdependent, even when the target and call sequences are random. For example, if in a test using a closed deck of twenty-five Zener cards the percipient first calls "circle" and the intended target is a circle, there are only four other circles left in the pack upon which that call of "circle" can displace. Thus the probability of a displacement hit on a circle will now be 4/24. But if the percipient calls "cross" when the target is a circle, there will still be five crosses left in the pack, and the probability of a displacement hit on that call of "cross" will be 5/24. The interested reader is directed to Russell (1943), who has derived a formula which expresses the probability of a displacement hit as a function of scoring on the intended target in a closed deck experiment. For the purposes of this review, it is sufficient to note that in a closed deck, psi-hitting on the target will result in displacement scores below chance level, and

psi-missing on the target, in displacement scores above chance level. In general, psi-hitting and psi-missing on a target of any given displacement will result in scoring below and above chance respectively on targets of other displacements.

Given the long-standing interest in the possible relationship between psi-missing on the intended target and displacement, it would be interesting to survey the experimental literature on displacement to see whether a relationship between the two exists. Unfortunately, there are problems which stand in the way of such an analysis. Basically, there would seem to be two aspects of the percipient's response which would tend to obscure the true relationship between scoring on targets of different displacements.

Firstly, a problem arises when a percipient scores extra-chance on the intended target and produces a non-random call sequence. The most commonly reported kind of non-randomicity is that of overcalling or undercalling doubles in the call sequence. Mrs. Stewart and Basil Shackleton, who were the first subjects whose tendency to displace was examined closely, were known to change their guess more often than chance (Soal, 1940), and many authors report that other subjects in ESP tests share this tendency to produce call sequences in which the calls are not independent of each other. The problem which this might cause for the interpretation of an apparent displacement effect is as follows. Suppose that a percipient is scoring above chance on the intended target, and has a tendency to change guess more often than chance. Then in all probability, after making a hit on the intended target, the percipient will change guess, thereby missing on the intended target for the previous trial which has now become the (-1) target for the current trial. Similarly, it is unlikely that the percipient made a (+1) hit on the trial preceding the trial on which he hit

the intended target, because he would have to have called a double in order to hit the target on the next trial (although response-bias effects would affect this pattern somewhat).

Similarly, if the percipient tends to psi-hit on the intended target but changes call less often than chance, scoring on the (+1) and (-1) targets will tend to be above chance. If the percipient tends to psi-miss on the intended target, then a tendency to change guess more often than chance will result in psi-hitting on the (-1) and (+1) targets, and a tendency to change guess less often than chance will result in psi-missing on the (+1) and (-1) targets.

The calculation of the magnitude of the spurious effect to be expected on a target of a given displacement as a result of the combination of extra-chance scoring on an adjacent target, and the extent to which the percipient tends to change his or her guess, is a complex problem, and one which is beyond the scope of the present author. However, a rule of thumb which is useful to keep in mind, and which gives some approximate limits to the size of artefactual displacement effects is that psi-hitting on the (n) target in principle can result in both psi-hitting and psi-missing which deviates equally far from chance since no change or a change of guess after a correct (n) call results in a (n-1) hit or miss respectively every time, whereas psi-missing on the (n) target can only result in a relatively small degree of psi-hitting on the (n-1) target (since a change of guess after a (n) miss would result in a (n-1) hit only one in four times using the standard ESP pack, even although it can produce (n-1) psi-missing of the same degree if there is no change of guess).

If the tendency to call more or less doubles than chance were the only peculiarity about a percipient's call sequence which affected displaced scoring, then it could be taken into account quite easily by counting the number of times a percipient changed call and then testing whether the observed values differed from the expected scores. There would also be no problem in determining which target (for example, of the (−1), (0) or (+1) targets) the percipient's psi had focused on, since that target would in general be the one with the largest deviation from chance scoring. Additionally, the symmetry of the effect (with, say, psi-missing on (−1) and

(+1) targets surrounding psi-hitting on the (0) target) would be an indication of its occurrence. Indeed, the effect of combining high scores on a target of a particular displacement with any type of non-randomicity in the call sequence upon scoring on targets on other displacements can be investigated by selectively rearranging runs of calls and targets within a study in such a way that although no run of calls is matched with the target run for which it was intended, the artificially-produced score on the target of the appropriate displacement is equal to the score observed in the experiment. Scores on targets of other displacements in the rearranged runs then provide a baseline for the real experiment, since any statistical artefacts due to peculiarities of the call sequence combined with a high score should also be apparent in the control experiment. This procedure was first used by Pratt (1967), but has been adopted by few researchers since.

However, complications arise if percipients can sometimes tell (either psychically or by feedback from the experimenter) whether or not they have succeeded in guessing the target and if this knowledge affects their call pattern. There is evidence (Milton 1985) that percipients can sometimes distinguish between success and failure on a trial-by-trial basis, and Cohen (1972) has presented evidence suggesting that whether or not a subject repeats a call depends upon whether they are told that their previous call was correct or incorrect; he further points out that there seem to be considerable individual differences in reaction to the outcome of the previous trial.

This situation could produce problems in interpreting a displacement effect. If a percipient's psi allows some knowledge of the intended target and some awareness of whether his or her calls are correct, then a spurious displacement effect could arise if, for example, the

percipient tended to change call after a (0) hit and repeat his or her call after a (0) miss; such a tendency would result in below chance scoring on the (−1) target. Similarly, apparent psi-hitting on the (−1) target could be produced if the percipient tended to repeat a call following a (0) hit and change call after a (0) miss. Such effects could arise even if the (0) score did not differ at all from chance (it should be noted that it is also possible that displacement could masquerade as a tendency on the percipient's part to change call with different frequencies after success and failure in some cases).

Thus, a spurious (−1) effect could result from the operation of psi on the (0) target (or a spurious (0) effect from the action of psi on the (+1) target, and so on). This effect would destroy the symmetry of any artefactual scoring produced by the combination of extra-chance scoring on a target of one particular displacement and a non-random call sequence, and would also mean that the target with the largest score was not necessarily the target of the percipient's ESP. When one considers that there may be dependencies not just between adjacent calls but between calls separated by one or more calls, and that knowledge of success or failure may also have effects on calls other than just the next one, the situation becomes even more complex. The question naturally arises of whether there are any scoring patterns which, without painstaking analysis, can be said to show evidence of displacement, rather than artefacts or effects related only to the intended target. This is an important question because very few researchers have taken these potentially confounding influences sufficiently to heart to examine for them, with the result that, unless there exist scoring patterns which cannot be accounted for by effects related to the intended target, the evidence for displacement would rest on a handful of studies. As discussed above, any tendency on the

subject's part to change call more or less often after success or failure could result in apparent psi-hitting or psi-missing on the (-1) target (or (-2), (-3), and other backwards-displaced targets, depending on the extent to which subsequent calls were affected by success or failure), even when no extra-chance scoring was observed on the intended target. This same problem does not, however, apply to forwards-displaced targets (except to the extent that changing guess to a different degree after, for example (+2) success or failure could result in spurious (+1) displacement). The only artefact which would seem likely to result in apparent (+1) displacement would be that involving extra-chance scoring on a target of another displacement (such as the (-1) or (0) targets), combined with some sort of interdependence between a subject's calls (such as the tendency to avoid calling doubles). Thus, if there were no significantly extra-chance effects on the (-1) or (0) targets, no spurious significant (+1) effects would be expected, and so a study which obtained highly statistically significant (+1) scoring in the absence of significant (-1) or (0) scoring woud have a strong claim as evidence for a real displacement effect. The (+1) score would need to be highly, rather than marginally significant since, strictly speaking, the hypothesis being tested should be that the observed effect differs from that which would be expected if it were an artefact, rather than that the observed effect differs from chance expectation. The extent to which artefacts are likely to have contributed to any apparent displacement findings examined in the course of the review will be discussed in each case.

The review opens with a brief account of the few papers involving displacement which appeared prior to Soal's (1940) paper, which was primarily responsible for establishing displacement as a phenomenon which other researchers could examine. Then follows a review of Soal's

displacement research, which is treated as a separate unit because of the now controversial nature of his data. The rest of the chapter reviews the findings of all those studies (except Soal's) which could contribute to an understanding of displacement. Because of the problems in interpreting displaced scoring patterns, this review of the between-trial displacement literature will examine only those papers which deal with the relationship between scoring on targets of different displacements in enough detail to allow assessment for the possible influence of artefacts. In addition, research concerning the relationship between apparent displacement and other variables will be reviewed in that section of the review to help provide some starting points for future research; only those papers which have included an examination of displacement in relation to other variables, rather than simply demonstrating its occurrence, will be considered. These constraints will, hopefully, go some way towards counteracting the reporting bias wich is likely to arise from a wide practice of post-hoc or superficial displacement analysis, since, arguably, the absence as well as presence of associated correlates or patterns would be regarded as worthy of report, once the trouble had been taken to analyse for them, and so a review concentrating upon those aspects should be less likely to produce misleading results.

2.2.2. The Earliest Displacement Research

Although Whately Carington is generally credited as the discoverer of displacement in his influential 1940 paper, the phenomenon had already been noted by other experimenters (as Thalbourne (1981) has pointed out). Ironically enough, the first person to have noticed the effect seems to have been the physicist cousin of the psychical researcher Malcolm Guthrie (1885), whose level of enthusiasm for Guthrie's experiments was only

sufficient for his attendance on a couple of evenings. Guthrie was trying out an informal series of tests on the paranormal transfer between people of visual impressions, tastes and smells. As his cousin pointed out, the percipient would sometimes describe the impression which had occupied the agent in the previous trial instead of the current trial; Guthrie termed this phenomenon "reminiscence". Conversely, Upton Sinclair (1930/1962) described Mary Craig Sinclair's accurate "anticipations" of drawings one or more trials ahead in a series of informally run picture-drawing tests.

The first quantitative investigation to examine displacement in any detail was published in 1938 by Dr. C.G. Abbot, an eminent astrophysicist and Secretary of the prestigious Smithsonian Institute in Washington, D.C., anonymously so that the Institute's reputation should not be damaged by association with the controversial field of parapsychology. Abbot's article received little attention, being brief, anonymous and appearing unobtrusively in the letters section of the Journal of Parapsychology. However, displacement was established as an important issue two years later by the publication in the June 1940 edition of the Proceedings of the Society for Psychical Research of two substantial papers on displacement, one by Whately Carington (also published concurrently in the Journal of Parapsychology), the other by S.G. Soal. During a series of picture-drawing experiments in which percipients nightly attempted to draw a concealed target, Carington observed that, although the percipients' drawings did not always best match the target drawing on the particular night for which they were intended, the response drawings for an experiment as a group always seemed to match the target drawings for that experiment better than the target drawings for another experiment. This led him to suspect that the percipients were demonstrating ESP, albeit on the wrong night's target; he termed this phenomenon "displacement".

Statistical analysis of the results produced by an independent judge provided highly significant evidence of between-trial displacement, and appeared to suggest that a percipient's drawing was more similar to a target drawing the closer together in time the target and the response were. Unfortunately, Carington's statistics, as far as they relate to this latter effect, are problematic.[3] Nevertheless, Carington made a valuable contribution in identifying displacement as a potentially interesting effect. Also important was his suggestion that S.G. Soal should reanalyse his own apparently psi-less experimental records for this new effect.

2.2.3. Soal's Research

Following Carington's suggestion, Soal analysed the records of the many card-guessing experiments which he had run up to 1939, and in 1940 published, alongside Carington's paper, the striking evidence for displacement which he claimed they contained. He continued detailed research into displacement, reported in later papers (Soal and Goldney, 1943; Soal, 1949), and joined with J.G. Pratt in reanalysing these and other data for further effects related to displacement (Soal and Pratt, 1951; Pratt and Soal, 1952).

It is unfortunate that the controversy over Soal's data renders his results questionable, although Markwick (1985) suggests in her review of the controversy that the displacement in his 1940 paper and in the early stages of the main Shackleton series (reported in Soal and Goldney, 1943) could conceivably have been genuine. She points out that fraudulent behaviour more commonly develops from initially genuine research as the original effect disappears, rather than being present from the beginning of a new project; until Carington suggested that Soal analyse for displacement, Soal's work had been uniformly unsuccessful. Also, as Palmer (1978) has

pointed out, some of the later reanalyses of Soal's data seem to reveal effects which Soal had not even thought of at the time. However, since the extent to which Soal's data was manipulated is not known, any of his findings relating to displacement must be regarded as suspect, and so Soal's work will be reviewed here as a separate whole. Nevertheless, an account of Soal's research has value because his replication of Carington's finding in an easily replicable and statistically accessible context encouraged other researchers to investigate displacement, and because his imaginative investigation of several aspects of displacement may stimulate future research.

2.2.3.1. Initial work with Shackleton and Mrs. Stewart

By 1939, Soal had tested one hundred and sixty percipients with Zener cards over a five year period, without any overall sign of success whatsoever. At Carington's suggestion, he examined for displacement data from seventy-six of his percipients who had made a total of 44,100 calls under "undifferentiated telepathy" conditions. He discovered two percipients, Mrs. Stewart and Basil Shackleton, whose records contained striking evidence of displacement.

Examining Mrs. Stewart's performance on (-8) to (+8) displacements for her 2000 "undifferentiated telepathy" trials, Soal found that she scored significantly below chance on (-2) targets (17.1%, $p(2-t)<0.003$)[4], and significantly above chance on (-1) (23.0%, $p(2-t)<0.001$), (0) (22.4%, $p(2-t)<0.01$), and (+1) (23.8%, $p(2-t)<0.0001$) targets. Shackleton's performance on (-8) to (+8) displacements for his 800 trials showed a roughly similar pattern with scoring significantly below chance on (-3) (16.9%, $p(\text{two-tailed})<0.05$) and (-2) (15.6%, $p(\text{two-tailed})<0.003$) targets, significantly above chance on (-1) (25.4%, $p(\text{two-tailed})<0.0002$) and

(+1) (25.3%, p(two-tailed)<0.0003) targets, and at chance on the intended target. Soal noted that although Mrs. Stewart's performance on the intended target had declined from above-chance scoring to chance in her second 1000 guesses, her scoring on both (+1) and (-1) displacements remained approximately constant throughout, indicating that her performance on displaced targets was independent of her performance on the intended target. In Shackleton's case, however, Soal proposed that the few high scores on target with which Shackleton began suggested that he may have begun by hitting the mark, and then lost it, guessing (+1) and (-1) displacements instead. Thus Shackleton's case might indicate that his perception on the intended and displaced targets were mutually exclusive.

Discussing the data of both subjects, Soal pointed out that both seemed able to guess (+1) and (-1) targets better than the actual targets, and that they guessed the (+1) and (-1) targets approximately equally well. He suggested that when the percipient made a guess on any trial, the images of both the (+1) and (-1) targets were equally strong in the percipient's subconscious, and both were struggling to emerge into consciousness. When these two images were of different symbols, either would be equally likely to become conscious. However, when both images were of the same symbol, the two images reinforced each other, and this situation (a "multiply-determined" guess) would be more likely to result in a (+1) or (-1) hit than when the symbols were different. He called this the theory of multiple determination; although his original data analysis was problematic (Bartlett, 1949; Soal 1949), a new method of analysis[5] was developed (Pratt, 1951) which showed that for Shackleton, scoring on (+1) and (-1) targets was only suggestively superior on multiply-determined guesses (p(one-tailed)~0.07) and that there was no evidence for the effect in Mrs. Stewart's data.

Turning his attention to the significantly negative scoring on (-2) displacements for both percipients, Soal found that Mrs. Stewart's (-2) performance could be accounted for by the combination of her high scores on (-1) displacements and her tendency to change her guess often. However, although the same hypothesis accounted for Shackleton's psi-missing on (-2) targets following (-1) successes, it did not account for the extent of his psi-missing following (-1) failures;the rates of change of guess after both (-1) successes and failures were approximately the same, so another possible hypothesis, that Shackleton may have tended to repeat a call after a (-1) failure, while avoiding repetitions as usual after (-1) successes, would not apply. Soal suggested that when Shackleton made a correct (-1) guess, the image of the (-1) target, having found conscious expression, would not influence the percipient one way or the other in his next guess. When the percipient made an incorrect (-1) guess, the image of the correct (-1) target would still be in his unconscious mind, and the percipient would try to exorcise the image by pointedly avoiding this symbol in his next response, resulting in the tendency to get the (-2) guess wrong. Although any hypothesis which involves inferences concerning unconscious logic are generally difficult to test, this finding does, nevertheless, suggest that Shackleton responded differentially to (-1) successes and failures.

2.2.3.2. Further work with Shackleton

Having discovered evidence of displacement in Shackleton's data, Soal began a new series of experiments with him in order to investigate further the nature of displacement (Soal and Goldney, 1943). Shackleton was a well-known London photographer who had come to Soal to demonstrate the reality of telepathy having seen a newspaper article on

Soal's work. Soal said of Shackleton, "Our subject... was of a very highly strung temperament, suffered frequently from ill-health, and found the severe air-raids' sometimes experienced anything but an encouragement to the tedious and concentrated work the experiments involved." Although Shackleton's ill-health was such that he was sometimes in acute pain, his performance remained unaffected. In addition, he often seems to have been indifferent to the level of his performance. Nevertheless, he persevered with the rather monotonous experimental task for more than two years in this series.

Although there were some variations in the experimental procedure, most of the sessions involved Shackleton having to guess which of five cards, each bearing a picture of a different animal, an agent in another room was looking at or touching. The target for each trial had either been preselected by means of a random number table, or was determined just before each trial by the agent's experimenter who selected by touch a counter from a bowl containing equal numbers of counters of five different colours. Shackleton's guesses and the targets were generally compared at the end of the session and scored for direct hits and (+1) and (−1) displacements. In the earlier sessions, Shackleton was present during the checking process, but in later sessions would join the others only when the checking was complete, at which time he was told in general terms how well he had done but not his exact scores.

Throughout the whole series of experiments, Shackleton scored significantly above chance only on (+1) targets (performance on (−2) to (+2) targets was always calculated for all trials), with a few exceptions which will be discussed below. In the previous study, Shackleton had scored equally well on both (+1) and (−1) targets, and significantly negatively on (−2) targets; Soal felt that the restriction of Shackleton's attention to (+1)

targets in the present study may have resulted from Soal's own emphasis upon precognition as the most valuable aspect of Shackleton's skill, suggesting that Shackleton had a certain amount of unconscious control over his displacement. Interestingly, at the beginning of the experiment Shackleton scored at chance on direct hits and significantly on (+1) targets during the first session. At the end of the session, Soal asked Shackleton to remind himself during the week before the second session that he would now score well on direct hits. On the second session he scored significantly above chance on direct hits (38.0%, $p(\text{two-tailed})=10^{-8}$) and slightly negatively on (+1) guesses. Following the session, Soal asked Shackleton to remind himself to score well on (+1) targets again next time; this time he scored significantly well with both direct hits (28.7%, $p(\text{two-tailed})<0.009$) and with (+1) targets (27.1%, $p(\text{two-tailed})<0.03$). Thus there seems to be at least some evidence that Shackleton had the potential to control consciously the object of his guesses.

There were two questions in particular which Soal hoped his work with Shackleton would answer. Firstly, he wanted to know whether the (+1) displacements reported in the previous paper were precognitive, or whether the percipient had instead clairvoyantly cognised the (+1) target from the prepared target list. Secondly, he wanted to know whether it was necessary for the agent to know the identity of the target in order for the effect to work.

Soal attempted to answer the first question by comparing Shackleton's performance when the targets were selected in advance of the session using random number tables with his performance when each target was selected immediately before the trial by means of the counters (thus excluding the possibility of obtaining a (+1) success without the use of precognition). 29.1% of Shackleton's (+1) calls were successful using the

prepared random numbers ($p(\text{two-tailed}) < 10^{-35}$), and 27.8% of his (+1) calls were correct when the targets were selected using counters ($p(\text{two-tailed}) < 10^{-11}$), both procedures being conducted at the normal rate of guessing and with Shackleton's usual agent, Miss Elliot. Soal concluded that Shackleton's unabated success with the counters demonstrated that his faculty was indeed truly precognitive although this would not rule out the possibility that displacement may be clairvoyant when the experimental design permits.

In investigating the second question of whether it was necessary that the agent should view the card for the success of the effect, Soal randomly interspersed the usual GESP trials with clairvoyant trials in which the agent simply touched the back of one of the five cards without knowing its identity. Shackleton was not told of this manipulation. Scoring in the clairvoyant condition did not differ significantly from chance, whereas (+1) scoring in the GESP condition was significantly above chance (30.3%, $z=14.81$, $p(\text{two-tailed}) << 10^{-12}$)*. Similarly, in a second series in which GESP and clairvoyance trials were alternated regularly and in which Shackleton knew which condition was operating while he made his guesses, scoring was again not significantly different from chance on the clairvoyance trials on the (+1) target, but was so for (+1) GESP trials (28.1%, $p(\text{two-tailed}) < 10^{-8}$). Soal concluded that the effects obtained were thus telepathic in character. However, reviewers (Palmer, 1978; Carpenter, 1977; White, 1976a) of the role of the agent in ESP have generally agreed that the presence of an agent does not necessarily result in better scores on the intended target than when an agent is not present. Although the majority of studies comparing clairvoyance with GESP in which the percipient was blind to which condition was operating have shown a superiority of scoring under GESP conditions compared with clairvoyance, there have been a

number of significant reversals. It may be that the percipient can detect paranormally whether a particular trial is taking place under GESP or clairvoyant conditions, and that some aspect of his or her subconscious reaction to the two conditions determines the level of scoring, rather than the presence or absence of an agent per se. Thus Soal's finding reveals little about whether an agent is necessary for the displacement effect, but would seem to indicate at least that displaced scoring, like scoring on the true target, can be affected by whether or not an agent is present.

A third question which Soal investigated concerned the effect upon Shackleton's performance of changing the target presentation rate. The normal rate of presentation was on average 2.60 seconds per card. Soal increased the presentation rate to 1.44 seconds per card, nearly double the normal rate. Working with Miss Elliot as agent, Shackleton's success now manifested itself on (+2) targets (29.7%, $p(\text{two-tailed}) < 10^{-8}$) instead of on (+1) targets as with the normal presentation rate. When the targets were presented every 5 seconds, at a rate slower than normal, Shackleton failed to score above chance in any way. Another agent, Mr. Aldred, was also used in these calling rate experiments; Mr. Aldred had acted as an agent for Shackleton during the experiments reported in the 1940 paper, at which time Shackleton had been successful on both (+1) and (−1) targets. With the reintroduction of Mr. Aldred in the current series, Shackleton again scored successfully on both (−1) targets (28.8%, $p(\text{two-tailed}) 10^{-8}$) and (+1) targets (28.2%, $p(\text{two-tailed}) < 10^{-7}$) at the normal rate; at the rapid rate, he succeeded instead with (−2) targets (28.5%, $p(\text{two-tailed}) < 10^{-6}$) and (+2) targets (28.2%, $p(\text{two-tailed}) < 10^{-5}$. Soal suggested that Shackleton either could guess targets presented between approximately 2 and 4 seconds in the future (and, presumably, the past), or that he had acquired a habit of guessing targets presented during this period engendered by his

normal guessing rate. A further finding consistent with this observation was that there was no evidence that Shackleton's last guess of a run of 25 trials related to the first target of the next run, the runs generally being separated by a pause of at least 6 seconds.

Another aspect of Shackleton's performance with Mr. Aldred was that his scoring on (0) targets was significantly negative (16.3%, $p(\text{two-tailed}) < 0.0002^{*}$) at both normal and rapid rates (as pointed out by Humphrey, 1944). Soal (1944) examined whether there was any relationship between the psi-missing on (0) targets, and the psi-hitting on the (+1) and (+2) targets combined with Shackleton's tendency to change his guess from one call to the next (in the normal rate tests when he scored well on (+1) targets) or to the next-but-one (in the rapid rate tests when he scored well on (+2) targets). He found that Shackleton changed his guess significantly more often after (+1) and (+2) successes, but not after failures (unlike his psi-missing on (-2) targets in the previous experiment (Soal, 1940) in which he changed his guess equally often after both (-1) successes and failures). Soal calculated that the deficiency in (0) hits following (+1) and (+2) successes could be accounted for by Shackleton's tendency to change his guess after such successes, and suggested that subconsciously, Shackleton knew when he had scored a (+1) or (+2) success and changed his guess in order to avoid succeeding on the (0) target; he suggested that Shackleton was only interested in postcognitive and precognitive successes and was therefore anxious to avoid successes on the intended target. In order to account for the psi-missing on (0) targets following (+1) and (+2) failures (17.4%, $p(\text{two-tailed}) < 0.04^{*}$), Soal put forward an explanation similar to the one he had used to account for Shackleton's psi-missing in his 1940 paper, namely that following a precognitive failure the image of the correct card would still be present in Shackleton's subconscious; in order to exorcise the

image, Shackleton would avoid it in his next response, resulting in a failure on the (0) target. However, Pratt (1949) pointed out that in order to conclude that Shackleton's guessing pattern was affected by his subconscious awareness of success or failure, it was necessary to demonstrate that the difference in call patterns accounted for Shackleton's (0) psi-missing following (+1) and (+2) successes and not vice-versa. The high rate of change of call following successes could, he said, be an artefact produced by a combination of psi-hitting on (+1) and (+2) targets and psi-missing on (0) targets acting independently, since a (0) failure following a (+1) or (+2) success would necessarily involve a change of guess, while a (0) failure following a (+1) or (+2) failure would not. Because Shackleton showed significant psi-missing on (0) targets after both (+1) successes and failures, Pratt concluded that in this particular case, his own explanation was the most plausible. However, later examination of the 1946-1950 data of Mrs. Stewart and of others did provide evidence suggesting that call patterns were affected differentially by success and failure in a way that could not be explained by displaced scoring (Pratt and Soal 1952). This being the case, it would seem to be difficult to tell whether the (0) psi-missing was a real effect in itself or an artefact caused by a differential reaction to forward displacement success or failure, since neither effect would seem to have grounds for logical priority. This problem may be worth bearing in mind in future investigations of both displacement and of call pattern effects.

Another benefit of Shackleton's renewed success with both forward and backward displacement with Mr. Aldred was that it allowed Soal to further investigate his theory of multiple determination. Soal again investigated the reinforcement effect in Shackleton's trials with Mr. Aldred. Pratt's (1951) evaluation showed that scoring on (+1) and (-1) targets at the

normal rate was significantly superior for multiply determined guesses (p(two-tailed)=0.0009) and for (+2) and (-2) targets at the rapid rate (p(two-tailed)=0.0001), indicating that Shackleton's performance was affected at least at times by two targets at once, instead of just one.

Returning to the data as a whole, Soal found no significant tendency for hits to occur in groups, nor were hits more frequent in certain positions of the run than others. However, an independent analysis of this data by Humphrey and Rhine (1944) revealed some interesting decline effects. They examined those sections of the results which showed significant displacement scoring, and looked for position effects in (-1), (0), and (+1) scores. Their main analyses concerned trials performed at the normal rate, and they analysed for position effects within the whole series; within each session; and within each page of 50 trials. Over the whole series, for the GESP tests with Miss Elliot as agent, there was a significant decline in scoring from beginning to end with both (0) ($p(\text{two-tailed}) < 0.003$) and (+1) targets ($p(\text{two-tailed}) < 10^{-9}$). With Mr. Aldred as agent, there were three short periods of testing of two sessions each, and the three groups were separated by long periods of time; this being so, Humphrey and Rhine thought it most appropriate to compare performance on the three first sessions of each group with the three second sessions, since each group was more like a self-contained mini-series than part of a larger, continuous series; the comparison showed non-significant declines for (-1) and (+1) targets while scoring on (0) targets remained constant. Across the three groups, there was no change in scoring on (-1) targets, a non-significant decline in scoring on (0) targets, and a significant incline on (+1) targets.

Looking at the distribution of hits across individual sessions, Humphrey and Rhine compared the first and last halves of each session, and the first and last pages of 50 trials each as two separate measures.

With Miss Elliot as agent, scoring both on (0) and (+1) targets declined significantly within the sessions on both measures (for (0) targets, first/last page comparison p(two-tailed)<0.005; half-session comparison p(two-tailed)<0.03: for (+1) targets, both first/last page comparison and half-session comparison p(two-tailed)<0.05). With Mr. Aldred as agent, scoring on (-1), (0) and (+1) targets declined on both measures, the decline being significant for both measures with (-1) targets (first/last page comparison p(two-tailed)<0.03; half-session comparison p(two-tailed)<0.004) and for the half-page comparison for (+1) targets (p(two-tailed)<0.04).

For those trials carried out at the rapid rate, Humphrey and Rhine examined for (0) and (+2) position effects,.and additionally (-2) effects when Mr. Aldred was the agent. They found non-significant declines with Miss Elliot as agent, both across the experiment as a whole and within the sessions. Mr. Aldred's data for (-2), (0) and (+2) targets showed similar declines which were statistically significant for the first/last page comparison for both (-2) (p(two-tailed)<0.02) and (+2) targets (p(two-tailed)<0.03).

No significant declines were found within the page of 50 trials; Humphrey and Rhine suggest that the run of 25 may instead have been a more meaningful psychological unit for Shackleton, and that a unit of 50 trials (two runs) may not therefore have been an appropriate unit of analysis.

Humphrey and Rhine attributed the declines in scoring across the experiment to increasing boredom on the part of the percipient, citing other studies with similar findings and noting in support that the only incline in scoring which they found occurred across the three widely separated groups of sessions when Mr. Aldred was the agent. More interesting than

the occurrence of declines in displaced scoring was the observation that declines appeared in scoring on both the intended and displaced targets. Humphrey and Rhine concluded that whatever caused the declines affected the ESP process itself, rather than a decline on a target of a given displacement being caused by the percipient switching to a target of a different displacement; for example, a decline of scoring on (0) targets was not accompanied by an incline in scoring on, say, (−1) or (+1) targets, as Soal had tentatively suggested may have been the case in Shackleton's first trials (Soal, 1940). However, although the declines in displaced scoring were generally from a greater to a lesser degree of psi-hitting, most of the declines on the (0) target were from psi-hitting to psi-missing; this might indicate that the declines on the intended and displaced target were not the result of a single process.

2.2.3.3. Further Work With Mrs. Stewart

Of the later experiments run by Soal, only one is of interest as regards displacement. In 1949, Soal reported the results of his first tests with Mrs. Stewart since the original series which he had reported in 1940. These were run in a similar fashion to the Shackleton series, with the agent in one room looking at one of five animal picture cards indicated by an experimenter on each trial while Mrs. Stewart, in another room, recorded her guesses supervised by another experimenter. Although Mrs. Stewart's scoring was in general concentrated upon the (0) target to a significant degree, she began to score negatively on (+1) targets after about twenty sessions, and the effect slowly increased; at the time of Soal's report, this psi-missing on the (+1) target was highly significant ($p(\text{two-tailed}) < 10^{-4}$). Soal suggested that this avoidance of (+1) targets might be related to Mrs. Stewart's expressed sense of being in competition with Shackleton's track

record; Shackleton had succeeded primarily on (+1) targets, and Mrs. Stewart's psi-missing may have been an attempt to avoid copying Shackleton. An additional finding in this study was that when the presentation rate of the trials was speeded up, Mrs. Stewart no longer scored significantly positively on (0) targets but instead scored significantly positively on (-1) targets, which Soal termed a 'lag' effect. Mrs. Stewart's reaction to an increased guessing rate is in contrast to Shackleton's. Whereas guessing at a rapid rate increased his already established displacement, seeming to indicate that he displaced a fixed time ahead or behind, the increase in rate caused Mrs. Stewart to displace when she had before performed well on the intended target. Thus a percipient's reaction to a change in rate of guessing may be idiosyncratic.

Following this study, Soal and Pratt (1951) analysed it and two other studies with Mrs. Stewart as percipient (Bateman and Soal, 1950; Soal and Bateman, 1950) for evidence that the target order affected Mrs. Stewart's responses. They found that she scored significantly better on the first call of a target non-double than on the first of a target double ($p=10^{-27}$) (psi-hitting on the first of a non-double, psi-missing on the first of a double) and related this finding to displacement since it seemed to indicate that knowledge of the following target influenced her response. On deeper examination (Pratt and Soal, 1952), they found that the low scoring on the first call of a target double was confined to those cases when her calls were not doubled. They interpreted this finding in terms of her avoidance of (+1) hits motivated by jealousy of Shackleton. They suggested that on those occasions when Mrs. Stewart realised that she was guessing the first of a target double, she would miss on the first call in order to avoid making a (+1) hit at the same time, and then her guess would change to hit the intended target on the second call, hence the association

between the calling of a non-double and psi-missing on the first call of a target double. However, when Mrs. Stewart failed to realise that she was guessing the first of a target double, her usual tendency to psi-hit on a trial-by-trial basis asserted itself, and so her call would be repeated when she achieved two consecutive (0) hits.

This interpretation was abandoned as a result of a later analysis of the same data, in which Pratt (1967) found that Mrs. Stewart scored significantly above chance on both (+1) and (−1) targets on those pairs of guesses in which she missed the intended targets, even although her overall tendency was one of negative (−1) and (+1) displacement. He ran a control analysis by selectively rearranging call and target runs to yield scores on the intended target as high as those in the original series by means of a reiterative random process. The displacement effects found in the series were not found in the control series, indicating that the effect was psychological, and not a statistical artefact arising from high scoring on the intended target coupled with peculiarities of the call or target sequences. The displacement psi-hitting in pairs of (0) misses was significant ($p < 10^{-6}$) for the first five subseries in which she scored successfully on the intended target, but not for two series which had been unsuccessful. Pratt took this to show that scoring on the intended and displaced targets were two aspects of a single psychological process.

Pratt now reassessed his explanation of Mrs. Stewart's tendency to psi-miss on the intended target when it was the first of a target double. He had supposed that this effect was due to her avoidance of making a (0) hit which would also be a (+1) hit, because she did not want to copy Shackleton by displacing. However, he felt that the fact that Mrs. Stewart did not seem to be trying to avoid displacing in the miss areas of the run made it less likely that she did so in general. He suggested that Mrs.

Stewart was more accurate in identifying than locating targets, and that her psi-hitting on both the intended and displaced targets was due to her accurate target identification, with accurate location taking place only when she scored a hit on the intended target. He further suggested that Mrs. Stewart would occasionally get a correct impression of a target which was approaching in the series, and get ready to make the call at the right time, saving it until then, and avoiding it afterwards so as not to spoil the effect. This would account both for her positive displacement in the (0) miss areas of the run and for her positive (0) scoring in the areas of the run where there was psi-missing displacement; in both cases, the psi-missing would be regarded as avoidance of the correct call rather than avoidance of the target. The hypothesis would also be consistent with Mrs. Stewart's tendency to psi-miss on the intended target which was the first of a target double, since she would be likely to avoid calling this target if she had located the second, but not the first target of the double and wanted to save the call until that trial. Pratt also noted that Mrs. Stewart's displacement in the miss areas of the run virtually disappeared in the fifth and last of those subseries which were successful, and her scoring on the intended target was slightly higher than in the two previous subseries, suggesting that Mrs. Stewart's ability to locate the target may have improved, converting displaced hits into hits on the intended target. Pratt suggested that further research was necessary to see whether the hypothesis held up with other subjects.

2.2.3.4. Discussion of Soal's Work

A number of the findings based on Soal's experiment, if reliable, have some bearing on the nature of the relationship between target and displaced scoring. In Shackleton's case, Soal (1940) felt that the fact that

he had begun with high scores on the intended target, and afterwards scored well only on the (-1) and (+1) targets suggested a (presumably unintentional) change in focus from one set of targets to another. However, Humphrey and Rhine's (1944) analyses of Shackleton's data from a later experiment (Soal and Goldney, 1943) showed that declines in displaced scoring across time were generally from a greater to a lesser degree of psi-hitting, while most of the declines on the intended target were from psi-hitting to psi-missing, indicating not only the presence of effects on both the intended and displaced targets at once, but also their independence of form.

Mrs. Stewart's data are no less inconsistent. In her initial tests with Soal, her scoring on both (-1) and (+1) targets remained at a consistently high level, while her performance on the intended target declined from an above-chance to a chance level. In a later study (Soal, 1949), while in general scoring above chance on the (0) target, she began after about twenty sessions to score negatively on the (+1) target, an effect which slowly increased. Thus in Mrs. Stewart's case, it would seem that overall scores on targets of different displacements were independent of each other. However, Pratt (1967) suggested that the two scores were interdependent, since psi-hitting displacement appeared on the (0) miss areas of the run, and psi-missing displacement in the hit areas; he hypothesised that the psi-hitting on both intended and displaced targets was due to Mrs. Stewart's accurate identification of a target, and that whether the hit was on the intended or a displaced target depended on whether she also accurately located the target. The psi-missing accompanying these hits was, he suggested, due to her 'saving' a guess for what she considered to be the appropriate moment and thus avoiding it on other trials.

Although both subjects' data gave conflicting answers to the question of interdependence of scores, Shackleton's results yielded positive evidence of the simultaneous influence of targets of different displacements upon each other in the form of the 'reinforcement effect', although Mrs. Stewart's did not. Unfortunately, no study since has involved an appropriate analysis for the reinforcement effect, and so it remains unknown whether the effect was unique to Shackleton.[6]

Probably the most celebrated effect claimed for Shackleton was his displacement two calls ahead or behind when the calling rate was doubled instead of one call ahead or behind at the normal rate, apparently indicating that he guessed targets presented during a fixed time interval in the past or future. However, an increase in call rate caused Mrs. Stewart to 'lag behind' and score on (−1) targets instead of on (0) targets as she had done at the normal presentation rate. This would seem to suggest that there may be individual differences in reaction to change in guessing rate.

The only other effect to emerge as being of particular interest to displacement research is that of the possibility of conscious control of displacement; there was some indication at the beginning of the Soal and Goldney (1943) series that Shackleton could influence consciously whether he hit on the (0) or the (+1) target. This possibility of conscious control, although potentially important as a means of preventing displacement, has never been investigated further, probably because few researchers would wish to ask subjects to think about displacement for fear that the wind would change and they would get stuck that way. However, Tart (1977) has suggested that there may be internal cues which are associated with the occurrence of displacement and which could be recognised with the aid of immediate feedback training and exploited to avoid displacement.

In addition to findings having a direct bearing upon the nature of

displacement, the work of Soal and of Pratt on Shackleton's data in particular was useful in highlighting the need to consider displacement effects and possible changes in call sequence as a result of success or failure on a previous trial together, where necessary, since either could sometimes seem to be the other. Also, Soal and Pratt together laid the foundations for an examination of displacement effects in which potential artefacts were carefully considered. However, because Soal's data may not have been reliable, the rest of this review will not include his studies.

2.2.4. The Relationship between scoring on targets of different displacements

As discussed earlier, there are many factors which could obscure the relationship between scoring on targets of different displacements and would render a survey of scoring patterns at best useless, and at worst, misleading. However, some researchers have attempted specifically to investigate such relationships and so have taken some care to rule out possible artefacts, and their work is reviewed here. Continuing Soal's practise of careful analysis, Pratt went on to analyse the data of other subjects in an attempt to tease out the possible relationships between displaced scoring, and scoring on the intended target. No systematic attempt was made to examine such relationships until a much later paper by Tart (1980) which, unfortunately, did not involve sufficient controls to deal with the problem of artefacts. However, Tart's work was probably useful at least in reviving the question of displacement in the minds of other researchers, directly resulting in a paper by Crandall and Hite (1983) in which the relationship between target and displaced scoring has been examined rather more carefully. A small number of other studies have reported analyses which have a bearing on this topic, and these are

reviewed here also.

2.2.4.1. Pratt's Research

Probably the most complicated analyses of scoring patterns related to displacement have been developed by J.G. Pratt in his research on the data of Basil Shackleton and Mrs. Stewart in collaboration with S.G. Soal (Pratt 1949; Soal and Pratt 1951; Pratt and Soal 1952; Pratt, 1967) in his examination of the records of D.W. and C.J., two high-scoring subjects from the Martin and Stribic (1940) series (Pratt and Foster, 1950a, b; Pratt, Martin and Stribic, 1974). Much of Pratt's work on this topic involved rather complex analyses which he used in an attempt to determine which effects were real, and which apparent. Although their primary value is perhaps as examples of the gruesome intricacies involved in trying to separate displacement effects from others, an account of them is necessary here so that Pratt's findings can properly be interpreted.

In his first paper (Pratt 1949), Pratt had been interested in whether the frequency of changing call was affected by the success or failure of the previous call. His conclusions about Shackleton and Mrs. Stewart have already been described in the section concerning Soal's research, and so only his investigation of the data of D.W. and of C.J. will be discussed here, each in turn.

Examination of D.W.'s data

In two papers (Pratt 1949; Pratt and Foster 1950a), Pratt examined in detail the scoring patterns of D.W. Pratt had found that D.W. repeated calls more often after misses than hits, and examined the data for overall psi-missing on (-1) targets which might give the appearance of such an effect. However, (-1) scores after misses did not differ from chance, indicating that there was no general tendency to psi-miss on (-1) targets.

He then considered whether the difference in call sequences following hits and misses could be explained by D.W.'s tendency to call doubles more often than chance. To illustrate how this potential artefact could operate, Pratt considered the extreme case of overcalling one symbol. For example, if the percipient called 'circle' on every trial except when he or she changed call to make a hit on one of the other four symbols, he or she would show a strong tendency to change call (back to a circle) after a hit. The only hits not followed by a change of call would be those made on circles. After misses caused by calling 'circle', there would be no change of call except on the relatively infrequent occasions on which the percipient changed call in order to hit on another symbol. Pratt suggested that if the more frequent change of call following hits really was an artefact caused by the calling of too many doubles, then the tendency to change call should be just as evident on the calls preceding the hits as the calls following them. However, it turned out that an incorrect call coming before a hit made a double with the correct call more often than did an incorrect call following a hit, and so it seems that D.W.'s tendency to repeat calls more often after misses than hits was what it seemed.

Attempting to explain the finding that an incorrect call coming before a hit made a double with the correct call more often than an incorrect call following a hit, Pratt suggested that there may have been an overall tendency for D.W. to score above chance on (+1) displacement, in which case calls preceding hits would make doubles with the correct calls more frequently than calls following hits as observed. However, the overall (+1) score turned out to be significantly below chance ($p(\text{two-tailed}) < 0.001$). At the time of Pratt's paper, Stanford's (1967) paper on response-bias effects had not appeared. Stanford found that when percipients overcame their bias against making an an unpopular response, they were more likely

to score well on that response than on other, more favoured responses. Thus, if a percipient tended to avoid calling doubles, he or she would tend to score more highly on the call which completed the double than on others; such a situation would result in the scoring pattern observed by Pratt in D.W.'s data, since a percipient would tend only to call a double when the second call made a hit. However, it should be remembered that D.W. tended to call more, not less doubles than chance and so her scoring pattern would be the reverse of the one observed in order to fit Stanford's response-bias model; nevertheless, significant reversals of the response-bias effect have been noted (Milton, 1985), and so this particular scoring pattern should not conclusively be interpreted in terms of displacement.

Carrying the investigation further, Pratt examined the relative frequency of forward and backward displacement hits in pairs of consecutive (0) misses, and found that within such pairs, the forward displacement score was lower than the backward displacement score; however, since overall (+1) displacement was significantly below chance, this result is not surprising. Pratt also included a comparison of calls with targets two or three places away and found strong indications that the (+2) score was significantly higher than the (-2) score when there was a hit on the (0) target; however, given that D.W. tended to repeat calls more often after (0) misses than hits, and that her calls were known not to be independent, it is quite possible that this difference in (+2) and (-2) scores around (0) hits is artefactual.

When the difference between (+1) and (-1) displacement within pairs of misses was examined for each of the five symbols, some indication of a relationship between displacement and the tendency to overcall particular symbols was found. Subsequent analysis (Pratt and Foster 1950b)

to see whether the displacement difference was more marked in those pairs of misses near wrong double calls showed that the effect was stronger in the pair just after, but not overlapping, a wrong double, although the contrast between the pairs after wrong doubles and the rest of the data was not significant; considering the number of analyses carried out on D.W.'s data, such an insignificant result carries little weight. In summary, the only well-supported effects to emerge from D.W.'s data would seem to be a tendency to repeat calls more often after misses than hits, the presence of significant (+1) psi-missing, and a possible response-bias effect.

Examination of C.J.'s data

Pratt and Foster (1950b) went on to examine part of the data of C.J., another high-scoring subject from the Martin and Stribic series, for similar effects. Investigating a variety of pairs of call and target patterns (wrong calls checked against adjacent targets missed by their own calls; wrong calls checked against hit targets; and correct calls checked against missed targets), Pratt and Foster found that within pairs of (0) misses (i.e., wrong calls checked against missed targets), the (+1) score was significantly lower than the (−1) score ($p<10^{-11}$). Evaluating the (+1) and (−1) displacement scores separately, taking into account C.J.'s tendency to call doubles, his rate of scoring on the (0) and (+1) or (−1) targets, and the use of the closed deck, the (+1) score was found to be significantly below chance (p(two-tailed)$<10^{-14}$), and the (−1) score significantly above chance expectation, although to a lesser degree (p(two-tailed)<0.02). However, the positive deviation on (−1) displacement was accountable for in terms of the combination of the negative scoring on (+1) targets and C.J.'s tendency to

avoid calling the same symbol twice with only one call symbol in between. Thus the negative (+1) score within pairs of (0) misses was the main effect of interest, although Pratt and Foster continued to analyse the effect in terms of the difference between (+1) and (−1) scores. However, it should be noted that pairs of guesses in which a correct call was checked against a missed target also resulted in a superiority of (−1) over (+1) scoring; only in pairs of guesses in which a wrong call was checked against a hit target were (+1) scores larger than (−1) scores, and such pairs would be expected to show this pattern if a response-bias effect were present in C.J.'s data (as in the discussion of a similar effect in D.W.'s data, above). This being the case, it should be kept in mind that the difference between (−1) and (+1) scores was not restricted to pairs of (0) misses, only that it was larger in these pairs.

The next question which arose was how this displacement effect related to the degree of (0) scoring. They found that, as the run score on the intended target increased from zero, the (+1) displacement score within pairs of misses decreased steadily to a below-chance value ($p(\text{two-tailed}) < 0.0003$). However, it is possible that the two scores may have been related by some sort of artefact; although displacement was only measured within pairs of (0) misses, the probability that a pair of misses would be adjacent to a (0) hit, and therefore open to the influence of target-related artefacts, would increase as the (0) run score increased, possibly resulting in a spurious relationship between (0) and (+1) scoring. A re-evaluation of D.W.'s data showed no such relationship between the level of (0) scoring and the forward displacement. The next stage of the investigation was concerned with whether the degree of avoidance of (+1) targets was distributed uniformly over the run within the pairs of misses or varied in strength according to the proximity of a hit. A much stronger

contrast was found between the (+1) and (−1) scores in the first pairs of misses after a hit than in the remaining pairs of misses ($p(\text{two-tailed}) < 0.000003$), while the difference between (+1) and (−1) scores was not especially strong on those pairs of misses immediately preceding hits. Those pairs of misses which were adjacent to or involved one of an incorrect double call were omitted from this analysis, as were those pairs of misses before or after a correct call which was a member of a double, since C.J. tended to hit on the second call of a double more often than on the first, and the elimination of these cases removed any confounding factor due to the call sequence patterns around hits. A similar analysis further excluding instances in which the hit involved a double in the cards (since there was a tendency for more hits to be made on the second member of a target double than on the first which would have confounded the analysis), still found that the difference in (+1) and (−1) scoring in pairs of misses was more extreme after hits than before hits ($p(\text{two-tailed}) < 0.00005$). No such tendency for the displacement effect to be stronger on those pairs of misses after a hit had been found in D.W.'s data. Discussing C.J.'s stronger avoidance of the (+1) target immediately following direct hits than anywhere else, Pratt and Foster suggested that either the comparative strength of the displacement effect in this position indicated some awareness of success on C.J.'s part, or that there were times when C.J.'s ESP worked better than others and so both forms of C.J.'s ESP, namely psi-hitting on (0) targets, and psi-missing on (+1) targets, occurred at such times (although in this latter case, pairs of misses preceding hits should have shown as much displacement as those following hits). Again, however, the large difference in (+1) and (−1) scores in proximity to hits may simply suggest the action of an artefact which is related to call sequence effects in the proximity of hits. For example, a

tendency to produce more or less call patterns of the type ABA when the first call was a hit, and the second two misses, would affect the relative strength of the (+1)/(−1) difference adjacent to hits.

Pratt and Foster found a suggestively large difference between (+1) and (−1) scores ($p<0.04$) in pairs of misses of which the first call was the second of a wrong double call. In pairs of misses occupying other positions relative to the wrong double calls (except those following hits, which had already proved to involve an unusually large displacement difference), the difference between (+1) and (−1) displacement was not outstanding. However, this result was selected as the best of four results and should not therefore be regarded as conclusive. Indeed, it would seem so far that the only well-supported result in C.J.'s data was that of significant (+1) psi-missing.

Pratt and Foster went on to investigate other data from the experiments of C.J., collected both before and after the series which they had so far examined, and did not find any evidence of avoidance of (+1) targets in the misses, even although he still scored significantly above chance on the intended target; they concluded that the displacement effects seemed to a certain extent to vary independently of C.J.'s scoring on the (0) target. For both C.J. and D.W., there was a decrease in the difference between forward and backward displacement scores in pairs of misses as the series progressed; although the degree of hitting on the intended target also generally declined, it did so much less dramatically than the displacement difference.

A later investigation (Pratt, Martin and Stribic, 1974) extended the exploration of displacement to all of C.J.'s ESP trials, including those covered by Pratt and Foster (1950b). Only pairs of successive (0) misses were considered in an attempt to avoid possible confusion of displacement

effects with effects associated with hitting on the intended target when both occur within the same pair of trials. Additionally, pairs of misses involving with a call or target double were excluded, since it is not possible to score a displacement hit in such a situation, and the inclusion of such trials would serve to reduce the sensitivity of any analyses used.

Preliminary analysis showed that either (+1) or (−1) or both displacements occurred to a significant degree in three series of C.J.'s data, generally occuring in those sections of the data with comparatively high (0) run scores. The first of those series involved the down-through (DT) guessing method, in which the percipient attempted to guess the cards in order from top to bottom of the pack, recording the calls down the page. The second series was the one already analysed by Pratt and Foster (1950b), involving variations on the basic DT procedure, and the third series involved the up-through (UT) guessing method in which C.J. tried to guess the cards in order from the bottom to the top of the pack, this time recording his guesses from the bottom to the top of the page.

Examination of the displacement in these three series showed that in the first DT series, the first group of 100 runs which showed significant displacement gave a positive score on (+1) displacement, while in the later groups with significant displacement, the predominant effect was positive scoring on (−1) displacement. In the second series, involving DT variations, the displacement effect manifested as psi-missing on (+1) displacement, and in the UT series which followed there was psi-missing on (−1) displacement. Thus C.J.'s displacement seemed to show considerable variation over these series. Although the experimenters saw no way of relating the pattern of scoring in the first series to that in the other two, they suggested that the (+1) targets in the second DT series, and the (−1) targets in the third, UT series might be considered equivalent if the time at

which the targets were recorded on the page was more salient to the percipient than when he was guessing through the pack, since the targets were always recorded in the same order in both techniques while the order of the calls was reversed. However, this suggestion was a tentative one, and they recommended further research comparing UT and DT calling.

Examining the relationship between direct target hits and displacement in the first DT series, Pratt et al found a significant negative correlation between (0) and (+1) scoring while there was no evidence of a statistically significant relationship between (0) and (−1) scoring; since the predominant effect in this series had been on (−1) scoring, it was concluded that the significant correlation was unlikely to be psychologically meaningful. In the third series, which involved the UT procedure, with C.J. scoring below chance on (−1) targets, there was a significant negative correlation between (0) and (−1) scores and no significant relationship between (0) and (+1) scoring. However, such a correlation might be expected if the (0) and (−1) scores were related by C.J.'s tendency to call doubles more often than chance, and so it should be treated with caution.

A general problem in the interpretation of this study is the lack of examination for some statistical artefacts which may have accounted for at least some of the results obtained. The restriction of the examination to pairs of wrong doubles does not protect against problems related to non-random call sequences, differential rates of change of guess after hits and misses, or response bias effects, and the observed changes in the pattern of displacement over the three series may have been related to changes in these variables, rather than in the type of displacement. In conclusion, it seems that there is little that can be said about C.J.'s and D.W.'s displacement with any certainty, other than that it occurred (in both cases in the form of psi-missing on the (+1) target) in the data of two

subjects noted for their high (0) scoring.

2.2.4.2. Tart's Theory of Trans-Temporal Inhibition

In the course of his widely-known research on ESP training, Tart has put forward a theory of 'trans-temporal inhibition', based on findings apparently relating scoring on (-1) and (+1) targets to scoring on the intended target (Tart, 1978). Although it is possible that artefacts are responsible for his displacement findings (Stanford, 1978; Kennedy, 1980a, b), the questions which he attempted to address in his research are nevertheless interesting and, being among the most visible of research on displacement in recent years, his work merits discussion.

Tart performed two GESP training studies in which percipients attempted to guess which of a circle of ten lights on a display was illuminated on the agent's console. Feedback of the actual target was given after each trial. In the first study, the percipients scored significantly above chance on the intended target (14.4%,p(two-tailed)$<10^{-24}$), and significantly below chance on the (+1) target (6.6%, p(two-tailed)$<10^{-14}$). Scoring on all other possible forward displacements ((+2) to (+24)) was checked, but none differed significantly from chance. Scoring was significantly below chance on (-1) targets (p(two-tailed)$<10^{-6}$) and (-2) targets (p(two-tailed)<0.008), but Tart pointed out that this is what would be expected if subjects tended to avoid calling the position which they were told had been the last target, or the last-but-one. However, he suggested that this psi-missing on the (-1) target could have two components, one representing the subject's reluctance to call the last target, and one which was a genuine psi-missing of the previous target, and he put forward the idea of 'trans-temporal inhibition', in which he suggested that in order to enhance the detectability of the (0) target, the subjects suppressed information on both the (-1) and

(+1) targets, in a similar way to how lateral inhibition has been demonstrated to work within the nervous system.

In support of this hypothesis, Tart described several analyses carried out in both the first study, and in the second study in which no significant overall scoring had been found. In the first analysis, he correlated the (+1) score for each percipient with their (0) score, and found that the two were significantly negatively correlated in the first study ($r=-0.84$, $p(\text{two-tailed})<0.005$), a result marginally confirmed in the second study ($r=-0.73$, $p(\text{one-tailed})<0.05$), as would be expected if the degree of inhibition of the (+1) target were related to the degree of hitting on the target. Assuming that an equal amount of psi-inhibition took place on both the (-1) and (+1) targets, he subtracted the (+1) score from the (-1) score for each subject to obtain a measure of the subject's avoidance of the target due to normal psychological processes, which he termed 'maladaptive strategy boundness', and found that it correlated significantly with both (0) and (+1) scoring ($r=0.64$, $p(\text{two-tailed})<0.01$, and $r=0.83$, $p(\text{two-tailed})<0.001$, respectively); this pattern confirmed his expectation that the more a subject used a guessing strategy, the less psi-hitting on the intended target, and more psi-missing on the (+1) target would be observed. However, Tart ran a control analysis on some randomly-generated data which showed similarly high correlations between the strategy boundness measure, and the (0) and (+1) scores, and concluded that the relationship must therefore be an artefact; Stanford (1978) has pointed out that correlating (+1) scores with strategy boundness is equivalent to correlating the quantity R_1 with (R_1-R_2) where R_1 and R_2 are random variables, and Kennedy (1980a) cites an estimated value of such an artefactual correlation of 0.71, calculated by Dr. J.A. Greenwood, which is quite close to those obtained by Tart. Kennedy has also pointed out that

the occurrence of (+1) psi-missing is to be expected in the presence of (0) psi-hitting if the subjects' calls are not independent. The presence of such an artefact would also account for the significant correlations between (0) and (+1) scores observed. Another problematic analysis discussed by Kennedy was one involving what Tart had devised to be a measure of psi allowing for the possibility that the focus of the subject's psi would not necessarily be always exactly on target, but would nevertheless tend to be near, rather than distant from the intended target. He calculated a 'contrast measure' by subtracting the smallest from the largest of the (0), (+1), (+2) and (+3) scores, and a control contrast measure by subtracting the smallest from the largest of the scores on the targets from (+4) to (+24). He suggested that if the psi-hitting and the trans-temporal inhibition effects were concentrated near the trial contemporary with the subject's guess (i.e., the (0) trial), then the contrast measure from the (0) to (+3) targets should be larger than that from the (+4) to (+24) targets; this hypothesis was confirmed significantly in both the first study (p(one-tailed)<0.01) and the second study (p(one-tailed)<0.01). For most of the subjects, the contrast measure in the (0) to (+4) range was the difference between the (0) and (+1) scores, and so it seems that this analysis did little other than confirm a result which, as Kennedy pointed out, was probably artefactual.

To investigate the relevance of Kennedy's criticisms, Tart (1980) generated by computer new target sequences which contained the same frequency of target doubles as the original sequence, and a new sequence to mimic the subjects' observed degree of avoidance of calling the last and second-to-last target. Various levels of (0) hitting were simulated by 'doctoring' the response sequence at random intervals, but no significant results such as had been found in the training studies were observed. However, Kennedy (1980b) pointed out several problems with this control

analysis. Firstly, although the simulation did not yield correlations significantly greater than zero, no data were presented to demonstrate that the simulation correlations were significantly different from those observed, as would be necessary to counteract the artefact hypothesis. Secondly, the response sequence generated by the computer simulated the subjects' tendency to avoid repeating previous targets, but was not programmed to consider any tendency on their part to avoid repeating previous calls, or other such dependencies within the call sequence, which would be expected to give rise to spurious relationships between (0) and (+1) scoring. Finally, Kennedy questioned the validity of using a computer-generated response sequence in preference to the call sequences produced by the subjects themselves, since he felt it doubtful that the understanding of percipients' response biases is sufficiently thorough to allow them to be adequately modelled.

It seems, therefore, that Tart's theory of trans-temporal inhibition should not be considered to be supported by the displacement results obtained, since steps adequate to control for artefacts were not employed. However, his idea has been examined in a slightly different context in several studies reported by Crandall and Hite (1983) and Crandall (1985). Those aspects of Crandall's work which are relevant to the relationship between scoring on the intended and displaced targets appear in Crandall and Hite (1983). They suggested that a corollary of Tart's idea of trans-temporal inhibition would be that psi-missing on the intended target might sometimes be due to a percipient focusing on an adjacent target, so that information on the intended target would be suppressed in order to sharpen the focus on the displaced target. They suggested that, this being the case, psi-missing on the intended target should be accompanied by above-chance scoring on either (+1) or (-1) targets.

In two studies designed to investigate a possible relationship between ESP and 'social interest' (Crandall, 1980, 1981), people with low scores on social interest were found to show significant psi-missing, and their data were examined post-hoc in an attempt to reveal the processes involved in their psi-missing. Subjects were divided into two groups, those who scored above chance, and those who scored below, regardless of whether the individual deviations were significantly different from chance. Analysing only the trials involving (0) misses, to try to avoid artefacts related to scoring on the target, psi-missers obtained significantly more of both (-1) and (+1) displacements than psi-hitters, and the difference was as strong among those who scored high on social interest as among those who scored low. Crandall and Hite interpreted this as suggesting that, rather than being evidence of unconsciously motivated psi-missing, the psi-missing in this case may have been due to the percipients focusing on the wrong target (although it is arguable that social interest may not have been the only motivating factor in these studies, and that the psi-missing may have been related to other psychological variables). For psi-hitters, the average proportion of (+1) and (-1) displacements on trials involving (0) misses was 41.3%, which was significantly less than the psi-missers' score of 48.7% (MCE=40.0%, $p(\text{two-tailed}) < 0.01$). The proportion of displacements for the psi-missers was significantly above chance ($p(\text{two-tailed}) < 0.001$). However, psi-hitting combined with a tendency to change guess more often than chance would result in psi-missing on the displaced targets, while psi-missing on the intended target combined with a tendency to change guess would produce psi-hitting on the displaced targets so it is possible that the larger number of displacement hits in the psi-missers' data as compared with the psi-hitters' data may have been due to this artefact. Although Crandall and Hite only analysed those trials involving (0) misses,

such misses would more frequently be adjacent to (0) hits in the psi-hitters' data than in the psi-missers' data, and so such an artefact might still have been relevant. To examine this possibility, Crandall and Hite performed a control analysis in which both psi-hitters' and psi-missers' calls were systematically matched against sequences of symbols which had been another subject's target sequence, within those conditions which had shown a significant displacement effect for the psi-missers in each of the four studies. For those subjects whose new response-target matching yielded a score below mean chance expectation, there was no significant evidence of a displacement effect. It should be noted that this would not be an effective control analysis for such an artefact if psi-hitters and psi-missers differed in their call patterns; an earlier analysis on the data of these studies had compared the frequencies of repetitions of responses, and the distribution of the resposes over the five symbols without finding any significant differences, which finding goes some way to supporting the validity of the control analysis in this case. Another possibility, however, could be that the displacement had caused the (0) scores to fall below chance rather than vice-versa, because of non-randomicities in the call sequences, and so it should not yet be concluded that therewas a non-artefactual link between (0) psi-missing and displacement in these studies.

2.2.4.3. Other Observations

A small number of other studies which could have a bearing on the question of the relationship between scoring on targets of various displacements also merit discussion.

Osis (1956) conducted three series of Zener card tests using a single percipient, involving both long and short distance trials. In the long

distance runs, although no significant scoring was obtained on any of the (−1), (0), or (+1) targets, the distribution of (−1) hits was found to be uneven across the five segments of the run; the effect was explored first in series B ($p<0.007$) and confirmed in series A and C (combined $p<0.0003$). The distribution patterns were strikingly similar in all three series, showing a significant degree of association ($p<0.007$), a finding which was all the more curious since the pattern followed none of the patterns associated with the usual changes in ESP scoring over time; the scores from all three series were above chance at the end of the first segment, below at the second, above at the third, below at the fourth, and further below chance for series A and B, and above chance for series C, at the end of the fifth segment. The result is of interest in the context of the relationship between scoring on targets of different displacements because the distributions of scoring across the segments of the run showed no extrachance effects for the (0) and (+1) targets, which would indicate, if it were certain that the (−1) effect were truly a displacement effect, that (−1) scoring behaved independently of scoring on the other targets. However, no analyses were performed to determine whether the (−1) scoring pattern could be attributed to changes in displaced scoring or to changes in the operation of some other effect, such as the percipient's tendency to change guess more or less often after (0) hits and misses, and so no firm conclusion can be drawn from this study.

Bindrim (1947) examined the relationship between scoring on the intended target and a measure of what he called 'displacement trend'. Bindrim was concerned that displacement would not be apparent in the usual analyses if it tended to appear in small traces and shifted in direction, manifesting sometimes as forward, sometimes as backward displacement. He developed what he hoped would be a more sensitive measure of

displacement, which, instead of simply involving the number of displacement hits, would estimate the consistency of direction of displacement within the run; each run would be split in half, and if the same direction of displacement, either forward or backward, gave the larger score in both halves, then the run would be said to show displacement trend. By chance, half of the runs would be expected to show displacement trend, and half would not. Bindrim expected to find most evidence of displacement trend in those runs in which scoring on the target was low, and so examined those runs in Zener card tests in which run scores were between 0 and 3.

Analysing data from two studies run by Schmeidler (1946, 1947), Bindrim found significant evidence of displacement trend (124 runs with trend, 88 without; $p(\text{one-tailed}) < 0.007$). Runs in which the highest scores were on forward displacement and those in which the highest scores were on backward displacement contributed roughly equally to this result, a fact which makes the evidence for displacement trend difficult to account for in terms of artefacts related to target scoring. If dependencies in the percipients' call sequences tended to push the amount of displacement in these low scoring runs away from chance, scoring on the (+1) and (−1) targets would nevertheless be expected to be equal within each run (as discussed above in the introduction to the between-trial displacement section) and neither forward nor backward displacement would be expected to remain the larger during the run. If the percipients' frequency of change of call was different after hits and misses, only scoring on the (−1) target would be affected and so more runs on backward than forward displacement should contribute to the displacement trend. No evidence was found for displacement trend in runs with scores of 4 or more, suggesting that there was indeed a relationship between low target scoring

and the occurrence of displacement trend.

Each percipient in the three studies had completed nine runs, and Bindrim divided the runs into nine groups according to the respective positions of the runs within each session, and examined for position effects both in (0) scoring and in the proportion of displacement trend in the low-scoring runs. Both (0) scores and the proportion of displacement trend showed a non-significant tendency to decrease during the session, despite the fact that the highest proportion of displacement trend occurred in the lowest-scoring runs. Bindrim suggested that perhaps both high target scoring and the occurrence of displacement trend require the same conditions but are mutually exclusive; however, his suggestion should be regarded as tentative in the absence of a significant tendency for both (0) scoring and displacement trend to show the same pattern of scoring over time. Nevertheless, the finding that displacement trend only appeared in low-scoring runs and in such a way that known artefacts do not seem able to explain, is of interest. Unfortunately, no other studies have been reported using the measure of displacement trend which could lend support to Bindrim's findings. Moreover, given the many pitfalls involved in analysing displacement effects, it would be preferable to have had some sort of control analysis such as one involving the random mismatching of call and target sequences, to see whether it is likely that some as yet unsuspected artefact was operating within the data. Since he used an unusual measure in a field of inquiry fraught with problems, Bindrim's results should perhaps be treated with caution, but his procedure would seem to be worth future investigation as a possible means of side-stepping problems which occur with the more usual hit measure.

2.2.4.4. Summary

Sadly, very little of any certainty emerges from the research covered in this section. Indeed, the only finding concerning the relationship between targets of different displacements for which explanations in terms of artefacts do not account would seem to be that of Bindrim (1947), showing that displacement trend was present only in runs in which the score on the intended target was below chance, and even this finding should, arguably, be treated with caution since Bindrim used an unusual displacement measure which has neither been used since, nor subjected to critical attention by other researchers.

It is a sobering thought that Bindrim's study produces the only (relatively) reliable support for the widely-held notion that (0) psi-missing and displacement are linked, and, even then, his measure was of the tendency for the direction of displacement to be consistent within a run, and not the traditional displacement score. It may be that the data of the other studies discussed, if subjected to further analysis, may reveal more solid findings than they have so far. At present, however, it seems that their results must be regarded as inconclusive, and the relationship of displaced scoring to performance on the intended target unknown.

It will be remembered that those results from Soal's work which evaded artefactual explanations yielded inconsistent indications of the relationship between target and displaced scoring, within the data of both Basil Shackleton and Mrs. Stewart. The fact that the indications were inconsistent might indicate that there is no fixed relationship between target and displaced scoring. However, since Soal's data cannot be regarded as reliable, even this doubtful conclusion is not well-supported.

2.2.5. Psychological Variables in Relation to Displacement

For researchers who want to prevent displacement from appearing in their experiments, the most valuable part of a review such as this should be a discussion of psychological factors which may be associated with the occurrence of displacement. As discussed above, however, careful analysis is necessary to distinguish between displacement and other effects which are related to scoring on the intended target only; unfortunately, the majority of studies which have examined psychological correlates of displacement have not involved such analyses, and it is sometimes difficult to know whether any relationships which emerge are with displacement or with some other target-related effect masquerading as displacement. Nevertheless, a review of research into psychological aspects of displacement has some use since any variables which seem to be reliably related to the apparent occurrence of displacement are the ones which should be examined in any future, carefully analysed study of displacement. Furthermore, such variables could also be examined in relation to the call sequence effects which could give the appearance of displacement, so that there could be some basis for ruling them out or ruling them in as problems for any particular study.

2.2.5.1. Reaction to Testing Rate

The most examined psychological aspect of displacement has been the percipient's attitude to the pace of the experiment in which they are taking part. Stuart (1947) was the first to investigate this in a free-response study in which students in a classroom were asked to draw each of four different pictures at three-minute intervals. Some percipients mentioned during the test that they felt rushed, and so Stuart asked those who felt that they were rushed by the timing or inhibited by the rigidity of

the procedure to make a note of the fact. Overall, the experiment yielded significant psi-hitting on (+1) targets, slightly below-chance scoring on the intended target, and scoring close to chance on the (-1) target. The percipients who had felt rushed or inhibited accounted for all of the (+1) psi-hitting ($p(\text{two-tailed}) < 0.01$). As discussed above, the presence of significant (+1) scoring in the absence of high scoring on other targets cannot be accounted for in terms of effects related to the intended target, and so the (+1) scores may be taken at their face value in this study. However, Stuart's use of a single measure for the two variables of feeling rushed and of feeling inhibited by the experimental procedure makes it difficult to be certain exactly what aspects of the subjects' reaction to the test were being measured.

In contrast, in a mass ESP test using Zener cards in which the audience for a TV magazine programme were the participants, some subjects volunteered the information that they had felt rushed by the presentation rate of four seconds per card, and the experiment yielded significant psi-hitting on (-1) targets ($p(\text{two-tailed}) < 0.01$) with chance scoring on the (0) and (+1) targets (Green et al, 1963). The experimenters suggested that the presentation rate, if too high for many of the subjects, may have caused them to lag behind and score on the (-1) target instead of on the (0) target. Categorisation of the viewers into groups who were 'anxious' and 'non-anxious' on the basis of the pattern of their responses to a puzzle-solving task given immediately after the ESP test yielded no significant differences in scoring, even although such a variable might be expected to relate to whether the percipient felt that he or she had coped with the presentation rate. The hypothesis that being rushed caused (-1) scoring might have been better supported had the results of those subjects who reported being rushed been compared with those who did not, and

found to show a greater degree of (-1) scoring; however, this analysis was not performed.

Results compatible with those of Green et al were found by Schmeidler, Friedenberg and Males (1966), reported as a conference abstract. During the course of a GESP experiment, Schmeidler et al felt that the participants began with a mild interest in the novel procedure, but that they became increasingly impatient during the session to be finished and go. A post-hoc analysis of the overall chance scores found both of what the experimenters termed 'the two major indicators of impatience', namely a decline in (0) scores across the session, and the presence of (+1) scoring. Scores on the intended target were significantly above chance on the first quarter of the calls ($p<0.01$) and declined to a non-significant below-chance level on all of the later quarters, while (+1) scoring was significantly above chance overall ($p<0.02$), and especially high in the last quarter. Although the (+1) scoring obtained in the absence of extra-chance scores on other targets would seem to indicate a real effect, it should be noted that no direct measure of whether the subjects felt impatient was taken, and that the finding of (+1) scoring was post-hoc.

Another exploration of what they termed the 'impatience effect' was made by Schmeidler and Lewis (1969) in a study in which subjects made eight ESP calls in a forced-choice task on each of four aspects (age, sex, activity level and emotion) of people shown in concealed pictures. For all of the subjects, two different procedures were involved; for each of the first four trials, the subjects had to guess all four aspects of the concealed pictures, and on the second four trials, the subject was informed about two of the aspects and had to guess the other two. Most percipients had a strong preference for one of the two procedures. It was predicted that the 'impatience effect' would be present in the non-preferred procedure in the

form of high scoring on the (+1) target, while (+1) scoring would not be high in the preferred condition. For the intended target, scoring was significantly higher in the preferred procedure ($p(\text{two-tailed}) < 0.05$), with scores on the preferred procedure being slightly above chance, and scores on the non-preferred procedure being significantly below chance ($p(\text{two-tailed}) < 0.04$). According to prediction, in the non-preferred procedure, scoring on the (+1) target was significantly above chance expectation ($p(\text{one-tailed}) < 0.03$), while (+1) scoring was insignificantly below chance in the preferred procedure. For the first four trials when the percipients were unaware that the procedure would change, there was no significant difference in (+1) scoring between percipients who later said that they preferred this procedure and those who did not, while the difference between the two groups in the second four trials was significant ($p < 0.01$). Schmeidler and Lewis pointed out that their group of subjects, most of whom were students, were generally co-operative, while being accustomed to tight time schedules and motivated to achieve, and suggested that the 'impatience effect' of (+1) scoring might only be expected to appear in such subjects with a non-preferred procedure, presumably since other groups might not become so impatient while still maintaining a generally positive attitude towards the experiment. Interpretation of this study is problematic for two reasons. Firstly, the (+1) psi-hitting observed in the non-preferred condition may have been at least partly an artefact caused by a combination of the significant (0) psi-missing in this condition and non-random call sequences. Secondly, it is not clear that impatience would be the subjects' only reaction to the non-preferred condition; subjects might equally well be presumed to be resentful, bored, lacking in concentration and so on, and so the results of this study should not necessarily be interpreted in the context of the relationship between

displacement and impatience.

An attempt was made to explore this effect further by Heyman and Schmeidler (1967) (conference abstract). In this study, twenty-four subjects each made nine GESP runs at three different calling speeds. Three runs were made at three seconds per call, three at five seconds per call, and three at ten seconds per call. On the basis of their responses to a shortened version of the the Time Metaphor Test, the percipients were divided into two groups; those with predominantly Dynamic-Hasty attitudes towards time and those with predominantly Naturalistic-Passive attitudes. It was predicted that at the slowest speed of calling, Dynamic-Hasty percipients would tend to show impatience by jumping ahead of the target. The prediction was confirmed, since the Dynamic-Hasty percipients scored significantly more (+1) hits at the calling rate of ten seconds per card than at the other rates, while the results for the Naturalistic-Passive subjects were non-significant. However, no details of scoring on the (-1) or (0) target were reported, and so it is not clear whether this result truly reflects changes in (+1) scoring or in scoring on other targets. Osis, Turner and Carlson (1971) also administered a shortened version of the Time Metaphor Test to subjects in a multivariate ESP study; in a pretest, subjects in the 'dynamic' category scored positively on the (+1) targets, although just short of significance, but in the experiment proper, there was a slight positive relationship between 'dynamic' scores and psi-missing on forward displacement; however, no probability value was given and the result should not be regarded as conclusive.

Crandall (1985) examined data from three later studies by Schmeidler (1985) in which subjects had to guess the position of the hand on twelve clock faces, each with a hand pointing to one of the twelve positions on the face. Each subject had to respond to a different target

sheet at three different calling speeds; self-paced, fast (in which subjects were urged to go as fast as possible), and slow (timed to be at least twice as slow as the self-paced rate). Crandall found that psi-missers scored significantly higher on a combined measure of (−1) and (+1) displacement compared to chance at the fast calling rate, (p(two-tailed)<0.005), and significantly higher on displacement than other subjects at both the fast and self-paced rates. Those subjects who scored at or above chance scored significantly below chance on displacement at the self-paced rate ($p<0.05$). However, scores on the intended target, which may have contributed to these apparent displacement effects, were not reported and so these results are difficult to assess. In addition, the use of a joint measure of (+1) and (−1) displacement makes the study hard to interpret in the context of trying to determine whether calling rates affect the tendency to score on forward or backward displacement.

Finally, in a study in which the participants were given the opportunity to rate their degree of impatience for themselves on a rating scale (Schmeidler, 1971), there was no significant correlation between the ratings of impatience and the students' scores on the (+1) target and the direction of the correlation was not reported. A possible reason for this lack of relationship could be that the percipient's level of impatience determines whether he or she scores on the (0) or the (+1) target, and that other factors determine the magnitude and direction of scoring for each percipient. Such an explanation is not incompatible with the previous findings on impatience, in which groups of percipients were assumed to be impatient and, as a group, scored well on (+1) targets, since the groups may have been such that they would have scored above chance regardless of whether they displaced or not.

In summary, all of the studies examining the relationship between

a subject's reaction to test rates and displaced scoring have, without exception, proven difficult to interpret for one reason or another. No strong trends emerge from the studies with a discernible effect, even on a superficial level. Schmeidler, Friedenberg and Males (1966) found that subjects whom they felt were impatient psi-hit significantly on the (+1) target, and Schmeidler and Heyman (1967) found significant (+1) psi-hitting among 'Dynamic-Hasty' subjects at slow calling speeds. Although Osis, Turner and Carlson (1971) also found a tendency for 'dynamic' subjects to psi-hit on (+1) targets in a pretest, they did not do so to a significant degree, and the same subjects tended to psi-miss on (+1) targets in the actual experiment. At the other end of the pace scale, Stuart (1947) found that subjects who felt rushed or inhibited psi-hit on the (+1) target, while subjects who took part in an experiment by Green et al (1963) in which some subjects felt rushed, psi-hit instead on the (-1) target.

However, although the findings reported here may have been problematic, the variables of test rate and the subjects' attitude to it would still seem to be worthy of consideration. The findings concerning the effect of changing the test rate upon the performance of Basil Shackleton and Mrs. Stewart, if reliable, may suggest that the result of changing pace may in part depend upon whether the subject was scoring on the intended target or on a displaced target at their normal guessing rate; while an increase in calling rate caused Shackleton to displace to (+2) and (-2) targets instead of (+1) and (-1) targets, its effect upon Mrs. Stewart seemed to have been to cause her to change from (0) to (-1) scoring (a result compatible with that of Green et al (1963)). If this is the case, then an experimental procedure of the type used by Schmeidler (1985), in which each subject set his or her own pace as a baseline, would seem advisable to allow for individual differences in preference, combined with the use of

questionnaires concerning the percipient's reaction to changes in pace. For the purposes of analysis, subjects should perhaps be divided into categories of those who score best on the (−1), (0) and (+1) targets respectively at their normal rate, in case this aspect of their scoring in part determines the result of changing the rate of testing.

2.2.5.2. Fatigue

Another area of interest with respect to displacement scoring has been the general sense of well-being of the percipient. In the first quantitative study of displacement, Abbot (1938) tested his own ESP by making 6500 calls using a pack of Zener cards over a two-month period. During the first 3000 calls, Abbot got the impression that low scores accompanied a tired or aching head. He tested this hypothesis in the second group of 3500 calls and found that when well, he scored above chance and when tired or ill, below chance on the intended target. In addition, although his calls generally matched the intended target, Abbot noticed that his calls sometimes matched the preceding or following card. Examining those 1050 trials for which he had full records of both call and target sequences, he found that he scored significantly above chance on the intended target ($p(\text{two-tailed}) < 0.006^{*}$) and below chance on the (−2), (−1), (+1) and (+2) targets when well (although to a significant degree only for the (−2) target ($p(\text{two-tailed}) < 0.03^{*}$), which was the best of four results as well as possibly being an artefact caused by non-random call patterns); when ill or tired, he scored below chance on the intended target and the (−2) target, and above chance on the (−1), (+1) and (+2) targets, although none of the deviations were significant.[7] Thus, Abbot's first study showed little evidence of displacement or of any relationship between displaced scoring and fatigue.

In a second experiment, Abbot (1949) analysed his data separately for calls made in the morning, when he was mentally fresh, and the evening, when he was tired. He found a non-significant tendency to score above chance on the intended target in the morning, while scoring significantly below chance on (-1) targets ($p(\text{two-tailed}) < 0.00005$) and significantly above chance on (+1) targets ($p(\text{two-tailed}) < 0.006$). In the evening, he scored close to chance on all three targets. Thus it seems that in this study, Abbot's best scores were achieved when he was mentally fresh, in the form of significant (+1) psi-hitting and (-1) psi-missing. Since a feeling of well-being would normally be associated with psi-hitting on the intended target, this result is difficult to interpret, since if displaced scoring were simply misdirected target scoring, then displacement psi-hitting would be expected to have occurred, and not psi-missing as observed on the (-1) target. If displacement were a motivated error, it would not be expected to occur when the percipent was mentally fresh, unless some other factor caused the displacement.

In a precognition test using Zener cards in which overall scoring on the intended target was significantly above chance ($p(\text{two-tailed}) < 0.0002$), while (+1) and (-1) scores were not significantly different from chance, Nielsen (1956) reported that there was a significant tendency for forward displacement in percipients who rated themselves as physically tired ($p(\text{two-tailed}) < 0.007$), and as being busy with everyday considerations ($p(\text{two-tailed}) < 0.02$). However, it should be noted that the rating scale given to the percipients measured three aspects of their well-being, namely physical vitality, mental vitality, and feeling toward people in his or her life, with each aspect involving seven possible responses. There were thus twenty-one items involved in the analysis, which were also analysed with respect to backward displacement, and so

these results are the best of forty-two analyses.

Even if the results of the three studies discussed in this section were not difficult to interpret or possibly due to over-analysis, a conclusion would be hard to draw from them, since they are contradictory. In both of Abbot's experiments, extra-chance results were obtained only when he was well, but the most convincing evidence of displacement, which appeared in the second study, consisted of (-1) psi-missing and (+1) psi-hitting, making it difficult to determine whether the displaced scoring was misdirected target scoring, or motivated error. In contrast, Nielsen reported (+1) scoring among physically tired subjects. It would seem that further research is needed to determine what, if any, relationship exists between displacement and fatigue.

2.2.5.3. High Aim versus Low Aim

The effect of trying to score above and below chance on displaced scoring was examined by Randall (1972). In two experiments, eleven schoolboys each tried to influence the movements of a gerbil within an enclosure according to a randomly-determined series. In the first experiment, the boys tried for a high score, and in the second, for a low score. It was predicted that those who psi-hit in the first experiment would psi-miss in the second, and vice-versa. Although (0) scores showed a tendency to reverse from the first experiment to the other, neither (+1) nor (-1) scores showed a similar tendency. However, overall scores did not differ significantly from chance, and so little can be concluded from this failure of the hypothesis.

Crandall and Hite (1983) carried out two precognition studies in which the subjects first made 25 calls with the intention of succeeding, and then another 25 calls on the same targets having this time been asked to

try to miss the targets. They hypothesised that if the displacement effect associated with psi-missers was a result of misdirected psi, it would only be expected to occur when the subjects were trying to hit, not miss, the targets. Combining the results of the two studies, scores on the intended target were non-significantly below chance when the percipients tried to miss, and almost significantly below chance ($p(\text{two-tailed}) < 0.10$) when they tried to hit. According to prediction, there was no significant evidence of displacement in the low-aim condition among psi-missers, but when subjects were trying to score well, there was significant evidence of displacement among the psi-missers for the two studies combined ($p(\text{two-tailed}) < 0.05$), but not individually. It is possible that the almost significant degree of (0) psi-missing in the high-aim condition was an artefact caused by the significant displaced psi-hitting in this condition. In the absence of evidence of (0) psi-hitting in the high-aim condition, however, some caution may be advisable before concluding that the displaced scoring was misdirected (0) psi; the displacement here could equally well represent avoidance of the target subconsciously motivated by a reaction to stress. Some subjects in the study mentioned that trying to miss was easier, or involved less pressure than the high-aim condition, and it may be that the displacement observed in the high-aim condition represented a reaction to stress; in future research of this kind, the inclusion of a measure of stress may prove useful.

2.2.5.4. Intensity of Effort

Otani (1955) found that when he instructed himself to be indifferent to his performance, guessing with his eyes open, he scored significantly below chance on (-1) targets ($p(\text{two-tailed}) < 0.002$) and non-significantly above chance when he closed his eyes and concentrated

on scoring well, the difference between the two scores being significant ($p(\text{two-tailed}) < 0.002$). No such difference was observed in the (0) and (+1) scores. However, the restriction of the effect to the (−1) target suggests the possibility that the difference in (−1) scores may have been due to different frequencies of change of guess after (0) successes and failures in the two conditions. Moreover, since the relationship between concentration and performance is unestablished with respect to the intended target, it is difficult to compare the relationships of displaced and direct scoring to this variable.

2.2.5.5. Condition Preference Effects

In each of four Zener card tests run by Crandall and Hite (1983), subjects took part in both a GESP and a clairvoyance test, and were asked to indicate which condition they preferred. All four studies showed a significant degree of displacement among those subjects who scored below chance in the conditions (GESP or clairvoyance) which the majority of subjects preferred in each study (Study 1, $p(\text{two-tailed}) < 0.001$; Study 2, $p < 0.05$; Study 3, $p < 0.05$; Study 4, $p < 0.01$; combined $p < 0.001$), but not in the non-preferred conditions. However, when the conditions were categorised in terms of individual, rather than group preference, the psi-missers scored significantly above chance on displacements in both the preferred tasks ($p(\text{two-tailed}) < 0.001$) and the non-preferred tasks ($p(\text{two-tailed}) < 0.01$) with no significant difference between the scores, making the interpretation of the displacement effect with respect to task preference difficult.

In an earlier attempt to study what they felt was an 'impatience effect' of (+1) scoring, Schmeidler and Lewis (1969) had each subject in a forced-choice task guess under two different conditions; most subjects had

a strong preference for one of the two conditions. The subjects made eight ESP calls on each of four aspects (age, sex, activity level and emotion) of people in concealed pictures. For the first four trials, the subjects had to guess all four aspects of the concealed pictures while for the second four trials, they were informed of two aspects and had to guess the other two. Schmeidler and Lewis predicted that high (+1) scoring should be observed in the non-preferred condition, as was the case ($p(\text{one-tailed}) < 0.03$), while scoring in the preferred condition was non-significantly below chance. (0) scores in the non-preferred procedure were significantly below chance ($p(\text{two-tailed}) < 0.04$), and slightly above chance in the preferred procedure. For the first four trials, when the subjects were unaware that the procedure would change, there was no significant difference in (+1) scoring between those who later said they preferred this procedure and those who did not, while the difference between the two groups in the second four trials was significant ($p(\text{two-tailed}) < 0.01$). Schmeidler and Lewis suggested that their subjects, while generally co-operative, may have felt impatient in the non-preferred procedure and that the (+1) psi-hitting resulted from their impatience. However, the (+1) psi-hitting in the non-preferred condition may in part have been an artefact related to the significant (0) psi-missing in this condition combined with a non-random call sequence, and impatience is only one of a number of possible reactions to the non-preferred condition which could have influenced the result. Neither the experiments of Crandall and Hite (1983), nor of Schmeidler and Lewis (1969), therefore, offer results which yield clear-cut insights into displacement.

An experiment by Skibinsky (1950) was similarly inconclusive. He found that in each of three series, percipients scored significantly better on five different symbols than on five different names as targets for (0) targets ($p(\text{two-tailed}) < 0.008$), but no such difference was found for scores on (+1)

targets, even although (+1) scoring was significantly below chance in the first series ($p(\text{two-tailed}) < 0.02$). In this experiment, the unit of displacement was one day in which the experimenter looked at a form with two grids, one comprising a random arrangement of 25 symbols, the other, 25 names; since Skibinsky was not sure in which order the percipients had completed their response forms, he decided that a whole grid, rather than a single response, would be a more appropriate unit of analysis. It is possible that the significant (+1) result in the first series was not a genuine effect, since it is not significant at the 0.05 level if considered as the best of three series and so the absence of a preference effect may be due to the absence of a displacement effect, rather than suggesting that displacement is not influenced by preference.

2.2.5.6. Target preference effects

Stuart (1946) found no relationship between the percipients' liking, expressed in response to an interest inventory, for the subject matter of the four target pictures and success on the pictures in an ESP drawing experiment which he had conducted earlier (Stuart, 1945), either for scoring on the intended targets or the displaced targets. Scoring on the (−1), (0) and (+1) targets was not significant, although this study contributed substantially to the significant (−1) scoring obtained when combined with three other experiments from the same series. If a preference effect was present, it may be that scoring overall was not sufficiently high to yield a significant result, or that the percipients' liking for the subject matter of the pictures did not relate to their liking for the pictures themselves. For all of the experiments combined (Stuart, 1945), which yielded significant (−1) scoring with scoring on the (0) and (+1) targets at chance, no particular picture nor any particular category of pictures (such as representations of

living things, and pictures which were coloured) were especially successful for either (0) or (+1) scoring. However, it does not seem reasonable to assume that the majority of percipients would prefer one particular picture or category, and so these analyses should not be considered a strong test of the preference hypothesis.

2.2.5.7. Behaviour of Experimenter

Crandall (1985) attempted to examine the relationship between the displacement effect and factors conducive to psi in a clairvoyance study, by having one group of subjects tested by an experimenter who tried to give the impression that he was cold, hostile, and indifferent to the research, and a second group tested by an experimenter who was warm, friendly, and enthusiatic. Crandall expected that displacement should turn up among psi-missers under conditions favourable to psi, in accordance with the idea that such displacement represents misdirected psi rather than motivated error. Each subject completed 50 trials with Zener symbols. Contrary to expectation, percipients scored slightly below chance on the intended target in the favourable condition, and slightly above chance in the unfavourable condition, the difference approaching significance (p(two-tailed)=0.07); Neither psi-hitters nor those who scored at chance showed significant deviations from chance or differences between conditions in displaced scoring, but for psi-missers, displaced scoring was non-significantly above chance in the favourable condition, and significantly below chance in the unfavourable condition (p(two-tailed)<0.005). (Crandall pointed out that in terms of the number of psi-missers who scored above and below chance for displacements, both conditions had significant effects. In the favourable condition, 18 of the 25 subjects scored above MCE (p=0.028), while only 4 out of 17 did so in the unfavourable condition (p=0.029). However, this

result could have been partly an artefact related to non-randomicity of calls sequences and the fact that percipients scored below chance in the favourable condition and above chance in the unfavourable condition; such an analysis, which depended upon the direction, rather than the magnitude of displacement effect, would be expected to be particularly sensitive to such an artefact, whereas the significant below-chance displacement found in the unfavourable task by means of the t-test would be unlikely to be due to such an artefact, since target scoring in this condition did not deviate sufficiently far from chance to give an effect of the same magnitude as the displaced scoring).

Were it not for the fact that the (0) scores were not influenced as might have been expected by the experimenter's behaviour, it might have been concluded that displaced scoring behaved like (0) scoring with respect to this variable. It may be that the (0) scoring pattern was partly determined by the pattern of displaced scoring, combined with non-randomicity of the subjects' call sequences, rather than indicating the direct influence of the experimenter's behaviour on (0) scoring; however, without empirical support for such an explanation, it cannot be concluded that displaced scoring in this instance behaved like scoring on the intended target.

2.2.5.8. Expansion-Compression

Another psychological variable examined in relation to displacement is the dimension of expansion-compression in drawing. Those people who produce 'expansive' drawings, freely using the space at their disposal in an unrestrained way, are regarded as being healthily extroverted, while those who produce compressive drawings which are meticulous and convey an impression of uncomfortable constraint are

regarded as neurotically introverted (Elkisch, 1945). The investigation of this variable with respect to ESP was introduced by Humphrey (1946a), who examined data from a free-response clairvoyance experiment by Stuart (1945) in which percipients each attempted to draw four concealed pictures in succession. Overall, scoring on the (0) and (+1) targets was close to chance, but scoring on the (−1) target was significantly above chance ($p(\text{two-tailed}) < 0.004$). When the percipients were divided into those who were 'expansive' and those who were 'compressive', Humphrey found that the 'compressive' subjects scored significantly below chance on the intended target ($p(\text{two-tailed}) < 0.008$), and significantly above chance on the (−1) target ($p(\text{two-tailed}) < 0.001$), while 'expansive' subjects scored non-significantly above chance on the intended target, and non-significantly below chance on the (−1) target. The preferential matching method was used in this study, in which each target picture is rank-ordered with respect to each response drawing and each response drawing is then reranked with respect to each target picture, yielding a correspondence score. The scores on the (0) and (−1) targets were thus not independent. Recognising this problem, Humphrey attempted to sidestep the issue of independence by hypothesising that 'expansive' subjects would score on the (0) target and that 'compressive' subjects would score on the (−1) target. The (0) scores of the expansive subjects and the (−1) scores of the compressive subjects were significantly different ($p < 10^{-7}$), apparently confirming the hypothesis. Although it would seem that this analysis is still problematic, since the (−1) score may still partly be due to the psi-missing on the intended target, the (−1) effect is probably real since the deviation of the (−1) score from chance for compressive subjects was about twice that of the (0) score. Indeed, the (0) psi-missing for compressive subjects may have been an artefact of the (−1) psi-hitting.

Attempting to interpret her results, Humphrey pointed out that although the expansion-compression criterion has been used to reveal personality traits, it is quite possible that, in the unusual ESP test situation, people do not always react with their normal means of expression. Some may find the test situation amusing, some frustrating, some anxiety-provoking. An expansive drawing may be the norm for a person enjoying a game, while someone conscious of 'taking a Psychological Test' may respond with a compressive drawing. She tentatively suggested that those percipients who did not feel disturbed or constrained by the 'impossible' ESP task produced expansive drawings and were able to hit the intended targets. Those who felt frustrated or inhibited, or perhaps took the task too seriously, produced compressive drawings which reflected their anxiety while they attempted to draw the intended target. Once they had attempted to draw a target, they moved on with relief to the next, and this reduction of anxiety concerning the previous target may have allowed the features of that target to come spontaneously to the percipient's mind while he or she was struggling with the next 'impossible' task, rather like the 'tip-of-the-tongue' phenomenon.

In a second study, Humphrey (1946b) divided percipients from a group of GESP tests run by Stuart (1942; 1945; 1946; and two unpublished papers) into expansive and compressive groups. In contrast to her study of the clairvoyance experiments, the expansive subjects scored below chance on the intended target, while the compressive subjects scored above chance ($p(\text{two-tailed}) < 0.004$). Also unlike the clairvoyance experiments, there was no overall evidence of (-1) displacement, and the mean (-1) scores for both the expansive and compressive pericipients were very close to chance. A clairvoyance drawings test by Stuart et al (1947) was similarly unsuccessful in finding a significant relationship between (-1) displacement

and the compression-expansion dimension, although on the intended target, expansive subjects scored above chance, and compressive subjects scored below chance ($p(\text{two-tailed}) < 0.0003$). Like Humphrey's (1946b) experiment, this study differed from her first (Humphrey, 1946a) in that there was no overall significant evidence of displacement.

It may be that the expansion-compression dimension differentiates between percipients who psi-hit and those who psi-miss, and that whether a percipient displaces or scores on the intended target is determined by some other factor. However, the expansion-compression variable does not, on the basis of the findings of these studies, appear to predict reliably the direction of scoring of the two groups; Humphrey (1946b) found that compressive subjects psi-hit on the (0) target while expansive subjects psi-missed, whereas Stuart et al (1947) found the reverse pattern, with expansive subjects psi-hitting and compressive subjects psi-missing on the intended target. This being the case, it cannot be concluded from this group of experiments whether displaced scoring behaves like scoring on the intended target in relation to the expansion-compression variable or not.

2.2.5.9. 'Affectability'

Another variable which may have related to the percipient's reaction to test conditions was examined by Stuart (1946) in some further analyses of one series which formed part of an earlier picture-drawing experiment (Stuart, 1945) which was also examined by Humphrey (1946a) in relation to the expansion-compression dimension. After the ESP test, the percipients had been given an interest inventory consisting of sixty items, such as 'policemen' and 'algebra', which they had to rate according to their degree of liking for each item. Stuart divided the twenty-four percipients into two equal groups, those with the six highest and the six lowest scores,

whom he termed 'affectable', and those twelve with the scores closest to the median, whom he termed 'unaffectable'. According to Stuart's categorisation, therefore, an affectable person would be one who is extreme in the number of things which he or she likes or dislikes, while an unaffectable person is more moderate in expression. The unaffectable group scored slightly positively on the intended target, and slightly negatively on the (-1) target, while the affectable group scored slightly negatively on the intended target and significantly positively on the (-1) target ($p<0.0002$). However, it should be remembered that this series was one of those analysed by Humphrey (1946a) and which contributed to her finding that those who psi-hit on the (-1) target could be differentiated from those who did not on the basis of whether they produced expansive or compressive drawings. It may be that Stuart's dimension of 'affectability' was in essence very similar to Humphrey's compression-expansion dimension, particularly if both related to a person's reaction to performing an ESP task, and so Stuart's finding may add little to an understanding of displacement.

2.2.5.10. Belief in ESP

Bindrim (1947) examined the sheep-goat variable, this time in relation to what he called 'diplacement trend'. Analysing data from two studies run by Schmeidler (1946, 1947), Bindrim found a significant tendency for the same direction (forward or backward) of displacement to give the larger score in both halves of runs in which the (0) score was low. Equal proportions of sheep and of goats showed this displacement trend, and Bindrim concluded that there was thus no relationship between displacement trend and the sheep-goat variable. Bindrim's was the only study ever to examine displacement trend, and so the generality of his

result remains unknown.

The relationship between the more usual measure of displacement and a percipient's attitude to belief in ESP was investigated by Crandall and Hite (1983) and Crandall (1985). In six studies reported by Crandall and Hite (1983) subjects performing Zener card tests were asked to indicate whether or not they believed that ESP was possible under the conditions of the task. Although in all six studies there had been significant evidence for displacement in the data of psi-missers (in the preferred condition for the first four studies, and in the high-aim condition for the last two studies which involved precognition), only the last two studies showed a significant relationship between belief and displacement; when trying to score above chance, psi-missing sheep scored significantly above chance on displacement ($p(\text{two-tailed}) < 0.001$), while goats scored slightly below chance (it should be noted that 'psi-missers' were defined for the purposes of Crandall and Hite's study as those subjects who scored below chance, regardless of whether the deviation was significant or not, and that their psi-missing may have been at least in part an artefactual result of their displacement psi-hitting). Crandall and Hite observed that the subjects were generally more sceptical about the possibility of ESP in the last two studies, as shown by their responses to the sheep-goat questionnaire. Inspired by a suggestion by Schmeidler (1969) that the sheep-goat questionnaire would be of little use when the question of ESP was trivial to a respondent, they speculated that if the increased degree of scepticism in the last two studies indicated an increase in the salience of the sheep-goat question for the subjects, then the appearance of a significant relationship between attitude and the amount of displacement only in the precognition studies would fit in with Schmeidler's comments. In a later study by Crandall (1985), one group of subjects was tested by a hostile experimenter,

and another group by a friendly experimenter. For psi-missers from both conditions, sheep scored significantly higher on displacements than goats ($p<0.01$), with sheep scoring above chance, and goats below; the sheep-goat measure did not relate significantly to scoring on the intended target. As in Crandall and Hite's (1983) precognition studies, the subjects as a group were relatively sceptical about ESP. Each subject also rated the research for its potential for contributing to knowledge, their enjoyment in participation, and the pleasantness of the experimenter's behaviour, but none of these measures related significantly to scoring. Crandall concluded that the fact that high scoring on displacement was associated with those psi-missers who believed that ESP was possible indicated that such displacement was misfocused psi, rather than a subconsciously motivated error, in which case goats, not sheep, would have been expected to score highly on displacement.

The relationship of the sheep-goat variable to displaced scoring would probably be a useful area for future research, since its relationship to scoring on the intended target is well-established (Palmer, 1978), and also because the sheep-goat variable is directly concerned with the possible motivation for error. Whereas most of the psychological variables covered in this section can only obliquely be taken to involve a motive to do badly, the motive is rather more obvious in the case of lack of belief in ESP. The findings of Crandall and Hite (1983) and of Crandall (1985) seem to be a promising start in this direction, and fit in with the hypothesis that displacement is misdirected psi, not motivated error. As they suggested, it may be that a relationship between the sheep-goat variable and scoring will only appear when the question of belief in ESP is important to subjects.

2.2.5.11. Feedback

In an experiment examining the effect of feedback upon ESP, Jackson, Franzoi and Schmeidler (1977) found that although (0) scores did not improve significantly after feedback of success, post-hoc analysis showed improvements on both (+1) and (−1) scoring. On the two runs following the runs on which feedback of success was given on a trial-by-trial basis, scoring was significantly above chance for (+1) targets ($p(\text{two-tailed}) < 0.04$) for both runs, and significantly above chance on (−1) scoring for the first of the two runs ($p(\text{two-tailed}) < 0.02$); before feedback, and for the percipients in the control condition who received no feedback, scoring on neither the (+1) or the (−1) targets had differed significantly from chance. Jackson et al suggested that these high displacement scores may have resulted from the feedback, since feedback of success may carry with it a suggestion that the percipient will do well, and such a suggestion could elicit 'free-floating' psi which approximates, rather than hits the target. However, one would perhaps expect such 'free-floating' psi to hit the target, even if it tended to be inaccurate. Another possible explanation is that feedback of success did increase the percipients' awareness of success on the intended target in the subsequent runs, and that resulting changes in the call sequence around (0) hits and misses may have contributed to the apparent displacement effect, even although no extrachance (0) scoring was evident.

2.2.5.12. Birth Order

An experiment by Green (1965) attempted to investigate the effects of birth order and family size on ESP performance. Readers of a newspaper and of a women's magazine were asked to guess the order of an open deck of 25 Zener cards and to complete a short questionnaire giving details of

their position within the family. While a number of analyses yielded non-significant results, eldest children were found to score significantly differently from only children ($p(\text{two-tailed}) < 0.001$) on (-1) targets among readers of the women's magazine. Also within the magazine population, analysis of variance showed significant differences in (-1) scores between children from families of different sizes ($p(\text{two-tailed}) < 0.01$). Among the magazine readers, male and female eldest children scored significantly differently from one another on (-1) targets ($p(\text{two-tailed}) < 0.05$), and among the newspaper readers, male and female only children scored differently from one another ($p(\text{two-tailed}) < 0.05$). However, since the relationship between birth order and family size variables with respect to scoring on the intended target is itself unestablished, these findings shed little light upon the nature of displacement.

2.2.5.13. Other Variables

In two distance studies (Osis and Turner, 1968; Osis, Turner and Carlson, 1971), Osis and his co-experimenters examined a large number of psychological variables in relation to displacement by means of stepwise multiple regression analysis. In the first experiment, Osis and Turner obtained 30 regression coefficients significant at the 0.05 level when they correlated 25 independent variables with 12 measures of ESP performance; by chance, 15 such significant coefficients would be expected to occur if the variables involved were independent, and more if they were not. As Osis and Turner pointed out, it is not possible to correct for multliple analysis within such a statistical procedure, and so caution should be used in interpreting their results.

In the first study (Osis and Turner, 1968), only forward displacement scores were consistently above chance in each of the three

target locations in the experiment; overall, (+1) scoring was significantly above chance (p(two-tailed)<0.01). Scoring on backward displacement was significantly negative in one target location (p(two-tailed)<0.01), while scoring on the intended target was close to chance. Only high (0) scorers on a pretest were found to contribute to the positive scoring on forward displacement (p(two-tailed)<0.02), and those who had obtained large deviations from chance on the intended target regardless of direction (p(two-tailed)<0.05). Scoring on forward displacement also correlated significantly with a measure from the Rosenweig Picture-Frustration Study of the subject's tendency to remedy a frustrating difficulty himself (p(two-tailed)<0.01), with the subject's degree of relaxation (p(two-tailed)<0.01) and, paradoxically, with their anxiety (p(two-tailed)<0.02). Men had larger deviations from chance on (+1) scores than did women (p(two-tailed)<0.05).

One of four measures of scoring on backward displacement correlated significantly with one of four measures of scoring on the intended target in the pretest (p(two-tailed)<0.02). Scoring on backward displacement also correlated significantly with a measure of concern with frustrating obstacles from the Rosenweig Picture-Frustration Study, (p(two-tailed)<0.05), and with time spent in preparing for the ESP task (p(two-tailed)<0.02) on each of two measures of backward displacement. In an earlier study by Osis and Fahler (1965) the observed extra-chance (-1) scoring had been found to be attributable to those percipients who were unlikely to be concerned with frustrating obstacles, according to their responses to the Picture-Frustration Study. In contrast to forward displacement, women were found to score significantly better on backward displacement than men (p(two-tailed)<0.05). Since the relationships of none of these variables are well-established with respect to scoring on the

intended target, these results shed little light on the nature of displaced scoring.

In the next two experiments run by Osis, Turner and Carlson (1971), over 30 variables were correlated with several measures of target and displaced scoring. The psi-hitting score for a subject was its positive deviation from chance; if there was no deviation from chance or a negative one, the psi-hitting score was zero. Similarly, the psi-missing score was the negative deviation of the score. After each session, the percipients completed a questionnaire concerning their preparation for the ESP test, their attitude toward the task, and their mood. The experimenter's mood was also rated for each session. The Rosenweig Picture-Frustration Study was administered to subjects in experiment II, and Form A of the Eysenck Personality Inventory was given in both experiments II and III. After the completion of experiment III, subjects were asked to rate their liking for the experiment and for the experimenter who accompanied the targets, and to fill in an adapted form of the Time Metaphor Test. The scores of each percipient on (-1), (0) and (+1) targets in the preliminary test were also noted. Four measures of possible position effects were also used, and included the number of the session for the agent; the number of the session for the subject; whether the session was the first or second in the location; and the run number.

Several aspects of the mood of the experimenter with the targets correlated significantly with backward displacement. (-1) psi-missing correlated positively with his mood ($p(\text{two-tailed}) < 0.001$) in the first experiment. In the second experiment, (-1) psi-missing correlated positively with his feeling of elation ($p(\text{two-tailed}) < 0.025$), and negatively with his freedom from from anxiety, and (-1) psi-hitting correlated positively with his freedom from anxiety ($p(\text{two-tailed}) < 0.05$). Also, the interaction

between the subject's and traveller's elation correlated significantly negatively with (-1) psi-hitting. For the subjects, elation correlated positively with the degree of (-1) psi-missing in experiment II ($p(\text{two-tailed}) < 0.025$) and negatively with psi-hitting ($p(\text{two-tailed}) < 0.025$), and vitality correlated negatively with (-1) psi-hitting ($p(\text{two-tailed}) < 0.01$). (-1) psi-hitting correlated significantly positively with freedom from anxiety in experiment I ($p(\text{two-tailed}) < 0.05$), but significantly negatively in experiment II ($p(\text{two-tailed}) < 0.05$). The interaction between elation and extraversion in experiment II correlated positively with (-1) psi-hitting ($p(\text{two-tailed}) < 0.05$, while the interaction between vitality and extraversion correlated significantly negatively with (-1) psi-missing ($p(\text{two-tailed}) < 0.025$) and positively with psi-hitting ($p(\text{two-tailed}) < 0.05$). Several task-related items showed significant relationships with backward displacement; the subject's feeling of preparedness correlated negatively with (-1) psi-missing ($p(\text{two-tailed}) < 0.025$) in experiment II; perceived ease of task correlated negatively with (-1) psi-hitting ($p(\text{two-tailed}) < 0.05$) in experiment II; the feeling of closeness to the experimenter with the targets correlated positively with (-1) psi-hitting ($p(\text{two-tailed}) < 0.01$), and absorption in the task correlated positively with psi-missing and negatively with psi-hitting in experiment I ($p(\text{two-tailed}) < 0.05$ in both cases). The subject's feeling about the experimenter correlated positively with (-1) psi-missing in experiment II.

Turning to relationships between the psychological measures and forward displacement, no significant correlates were found with the experimenter's mood variables, but several appeared with those of the subjects. In both experiments, the subject's relaxation correlated significantly positively with (+1) psi-missing ($p(\text{two-tailed}) < 0.01$ in experiment I, $p < 0.001$ in experiment II) and significantly negatively with (+1)

psi-hitting (p(two-tailed)<0.05 in both cases). Elation correlated significantly positively with psi-missing in experiment I (p(two-tailed)<0.05), but also positively with psi-hitting in experiment II (p(two-tailed)<0.05). In experiment II, there was also a significant negative curvilinear relationship between (+1) psi-hitting and elation (p(two-tailed)<0.05). Vitality correlated positively with (+1) psi-missing in experiment II (p(two-tailed)<0.05), and freedom from anxiety correlated negatively with psi-missing in experiment I (p(two-tailed)<0.05). In experiment II, perceived ease of task correlated negatively with (+1) psi-missing (p(two-tailed)<0.01) and positively with psi-hitting (p(two-tailed)<0.05); absorption in the task correlated negatively with (-1) psi-missing (p(two-tailed)<0.001) and positively with psi-hitting (p(two-tailed)<0.05; the subject's feeling about the task correlated positively with (+1) psi-missing and negatively with psi-hitting (p(two-tailed)<0.05 in both cases). (+1) psi-missing correlated positively with extraversion (p(two-tailed)<0.01), and with the subject's Time Metaphor score (p(two-tailed)<0.05), and negatively with pretest scores on forward displacements (p(two-tailed)<0.05. In experiment I, (+1) psi-missing correlated positively with (0) pretest scores (p(two-tailed)<0.025). Again, it must be remembered that out of so many correlations, a large number would be expected by chance, and, as Osis et al pointed out, these significant relationships should be regarded with caution.

Further examination of the effect of the agent's mood upon scoring was made by Osis and Carlson (1972) in three experiments in which two agents (Osis and Carlson) sat with the same target arrangement of four columns each of twenty-five nature postcards laid face down on the floor, while the subjects made their responses at home. The subjects were told about one of the agents in their instructions, but were unaware of the other. Both agents rated their moods once an hour during each four-hour

session on the four measures of relaxation, elation, vitality, and freedom from anxiety. As in the experiment by Osis, Turner and Carlson above, psi-hitting and psi-missing scores were obtained for the (-1), (0) and (+1) targets. In none of the three experiments did either displaced or target scoring differ significantly from chance. For Carlson, relaxation correlated significantly positively with (+1) psi-missing ($p(\text{two-tailed}) < 0.01$) in experiments 2 and 3; elation correlated significantly negatively with (+1) psi-hitting in experiment 1 and positively with (+1) missing in experiment 2 ($p(\text{two-tailed}) < 0.05$ in both cases); vitality correlated significantly positively with (+1) hitting in experiment 3 ($p(\text{two-tailed}) < 0.01$); and freedom from anxiety correlated significantly positively with (+1) missing in experiment 2 ($p(\text{two-tailed}) < 0.05$). Only the correlation between elation and (+1) psi-missing was significant for Osis ($p(\text{two-tailed}) < 0.05$). No significant correlations were found with (-1) scoring.

Overall, there is a slight, but by no means conclusive tendency for displaced scoring to correlate in an opposite way to that which might be expected for scoring on the intended target in this group of studies. However, it should be remembered that there may well have been a high degree of intercorrelation among the many psychological variables, and so any preponderance of reversed correlates may simply have been due to the pattern of covariation of the psychological variables, rather than having any bearing on the nature of displacement.

2.2.6. Relationship of displacement to distance between target and percipient

A series of experiments by Osis has included an examination of the relationship between distance and displacement. In the first such experiment (Osis, 1956), a single subject attempted to guess Zener cards at

both long and short distances within the same session. For the long distance trials, the percipient, who was in Germany, was 4000 miles away from the experimenter with the cards to be guessed, who was in North Carolina; for the short distance trials, the percipient tested his own ESP by shuffling a pack of cards and then screening himself from them while guessing. His scoring on the intended target for the short distance runs was significantly above chance, but was non-significantly above chance for the long-distance runs. Neither (+1) nor (-1) displacement scores differed significantly from chance in both the long- and short-distance runs. However, for the long-distance runs, (-1) scores were unevenly distributed across the five segments of the run to a significant degree. Osis concluded that this showed an increase in displacement in the long distance runs, but since no similar analysis was performed on the short distance runs, such a conclusion would appear to be unwarranted.

In a later GESP experiment (Osis and Pienaar, 1956) carried out over an even larger distance of 7500 miles, between the experimenters in North Carolina, and the two percipients in Rhodesia, there was no evidence of (+1) or (-1) displacement, while there was a significant difference between (0) scores at slow and rapid calling rates; thus, although there was some evidence of ESP over the large distance, it did not take the form of displaced scoring.

Osis and Fahler (1965) found that (-1) scoring varied significantly between conditions ($p<0.009$) while (0) and (+1) scoring did not, in a two-by-two factorial design in which the distance between the percipients was either great (from North Carolina to Finland) or small, and in which the target order was determined either before or after the percipients made their responses. All four of the conditions probably contributed to this effect, and so it should not be concluded that either factor of distance or

time caused displacement to occur, but rather that (-1) scoring was influenced in some way by each of the four conditions. The percipients were aware at the time when some of the four conditions were in operation, and expectation effects may in part have led to to differences in scoring.

Osis and Turner (1968) carried out a study in which three different agents were stationed in New York, Los Angeles, and Tasmania, while the percipients were in their own homes located across the United States. For each percipient there was one station which was closest, one which was furthest, and one at a middle distance. The distances to the closest stations varied between less than a mile and 1,250 miles, and the furthest between 7,880 and 10,550 miles. Five cards of each of five different nature postcards were used for each run of 25, and the 25 cards were laid face down, in random order, in a column at the beginning of each session. Each subject took part in four sessions, during which he or she completed four runs of calls (one target run was prepared in New York, one in Los Angeles, and two in Tasmania, for each session), and the order of the runs for the various locations was counterbalanced to avoid confusion of distance with order effects. Although the subjects were told the locations of the three groups of targets, they were not aware of which run corresponded to which location.

Overall, (0) and (-1) scores did not deviate significantly from chance, but subjects scored significantly above chance on one of four measures of (+1) scoring ($p(\text{two-tailed}) < 0.01$). However, both backward and forward displacement scores were significantly different from chance for the New York runs, with subjects scoring significantly below chance on backward displacement and significantly above chance on forward displacement ($p(\text{two-tailed}) < 0.01$ in each case); scoring on forward

displacement in the Los Angeles runs was also independently significantly above chance ($p(\text{two-tailed}) < 0.05$), while (−1) scores were non-significantly above chance. Although scoring on the intended target was at chance, it showed significant decline effects ($p < 0.0001$). Only for forward displacement were the scores positive for all three target locations. Most subjects were closest to New York and furthest from Tasmania, and so Osis and Turner were careful to distinguish between distance effects and effects related to the differing personalities of the experimenters at the various locations, which could have acted in such a way as to mimic distance effects. Although forward displacement was most strongly positive in New York and weakest in Tasmania, indicating what could be a decline in (+1) scoring with distance, Osis and Turner felt that the occurrence of negative (−1) scoring in New York and Tasmania, and positive scoring in Los Angeles suggested that factors relating to the experimenter in each location, rather than distance, may have been operating.

In order to get around this problem, two subsequent experiments reported by Osis, Turner and Carlson (1971) replaced the three agents in the different locations by a single agent who took the targets around the world in order to avoid the possibly confounding influence of the personality of the experimenter in the different locations. The targets were displayed in New York, Paris, New Delhi and Sydney, while the percipients (57 in experiment I, 70 in experiment II) made their guesses in their own homes across the United States. In each experiment, the agent retraced his outbound route, thus visiting each city twice. Each pericipient took part in four sessions, being randomly assigned to one of the two (outbound or inbound) sessions in each location, so that position and distance effects should not be confounded. Percipients were blind to the location of the targets on any given session. Five different nature postcards were used as

targets and for each session, the experimenter with the cards arranged a closed deck of 100 such postcards face down in four columns of 25 according to a random procedure, leaving them arranged for four hours during which percipients could make their calls at any time. Data from the two experiments were analysed separately. Six ESP measures were used; the degree of psi-hitting on the (-1), (0) and (+1) targets, and the degree of psi-missing on these targets. In experiment II, there was a significant decline with distance in psi-missing on (+1) targets ($p(\text{two-tailed}) < 0.01$), and a smaller incline with distance on psi-missing on (-1) targets ($p(\text{two-tailed} < 0.05$) which Osis et al suspected to be an artefact related to the strong psi-missing decline on (+1) targets, which may in itself be the result of over-analysis, being no longer significant at the 0.05 level if corrected for the number of measures used. Scoring on the intended target showed no significant distance effects, and there were no significant distance effects in experiment III.

In conclusion, none of the experiments reviewed here seem to give clear support to the hypothesis that displacement and distance are related; indeed, the findings of Osis and Pienaar (1956) of a significant (0) target effect at a long distance and of Osis and Fahler (1965) that (-1) scores at both long and short distances contributed to a significant (-1) effect, would seem to indicate a lack of relationship between the two variables.

2.2.7. Alternation of Task Type

Researchers have seldom taken positive steps to try to avoid the occurrence of displacement in their experiments, but an exception to this general rule has been made in the case of two experimenters who, having observed displacement in their previous work, had their percipients make calls from different types of packs of cards in rotation, in the hope that the

interposition of different types of guesses between those on cards of the same pack would reduce the tendency to displace.

Thouless (1942), having suspected that several subjects in earlier experiments had been displacing to the (+1) and (+2) targets, used three different types of pack in two experiments in which he himself was the percipient. A Zener pack, a 'colour pack' with cards of five each of five different colours, and a 'number pack' with five of each cards with 1, 2, 3, 4, or 5 white circles on a black ground, were used. One card was drawn from each pack in turn, and the experimenter said, "Zener", "colour", or "number" to prompt the appropriate response. In the first experiment, only scoring on the number pack was significantly above chance ($p(\text{two-tailed}) < 0.05^{*}$), but only when considered in isolation. There was no indication of forward displacement. In the second experiment, there were again no significant results with the Zener and colour packs, but there was significant evidence of (+1) psi-hitting and (+2) psi-missing ($p(\text{two-tailed}) < 0.006^{*}$, $p(\text{two-tailed}) < 0.03^{*}$) using the number pack, and Thouless concluded that the use of the composite pack did not prevent displacement as he had hoped. However, these two results were the best of 15 analyses, since scoring was compared to chance for all displacements between (-2) and (+2), for each of three different card types; given also that the (+2) psi-missing result may have been largely due to the (+1) psi-hitting combined with non-randomicity of the percipient's call sequence, the apparent displacement in the second experiment may have been the chance result of multiple analysis.

When Rao (1962) alternated Zener cards with cards of the subject's choice to avoid displacement with a subject who had shown (+1) displacement in preliminary testing, she showed no sign of displacing in the experiment proper. However, details of her (0) pretest scores were not

given, and it may have been that the alternation of card types in the experiment broke up a tendency to make non-random call sequences which had acted in conjunction with extra-chance (0) scores to produce apparent displacement in the pretest. Abbot (1949) tried to overcome response patterning, rather than displacement per se, by placing each card from a shuffled Zener pack at different locations in his house, and read from exciting stories or listened to radio music between approaching a card in whatever order he pleased and calling it; in the morning, when "mentally fresh", he scored at chance on the intended target, significantly above chance on (+1) targets ($p(\text{two-tailed}) < 0.006$), and significantly below chance on (−1) targets ($p(\text{two-tailed}) < 0.00005$).

The findings of Abbot (1949) and to some extent, of Thouless (1942) both might suggest that displacement is not prevented by the interposition of a distracting task, although some caution should perhaps be applied to both their results since Abbot's study was not well-controlled by modern standards, and Thouless' results may have been the product of over-analysis. Rao's (1962) study, on the other hand, gives some support to the notion that alternating guesses of different types may have changed displaced scoring into scoring on the intended target, although his results were not reported in sufficient detail to be conclusive. It may be relevant that in both studies in which displacement was apparently obtained despite the interposed task, the experimenter was also the subject; the success or failure of the manipulation in preventing displacement may depend in part upon how convinced the subject is that the manipulation will work. Thus, Rao's subject may have found Rao's changing of the procedure more reassuring than an experimenter aware of the doubtfulness of its success. Even if the displacement in these studies was genuine, then, expectation may then have played a more important role than the interposition of a

different task.

2.2.8. The Effect of the Presence of an Agent on Displacement

The only study of the effect of the presence of an agent on displaced scoring in between-trial displacement was performed by Stephenson (1965) under rather informal conditions. In a two-by-two design, an agent was either present or absent, and the cards to guessed were considered one at a time, or several together. Although (+1) scoring was significantly above chance when an agent was present and considered each card individually ($p(\text{two-tailed}) < 0.002$), the significance of scoring in this condition and not in the others would seem to have been due only to the larger number of trials in this condition rather than a difference in the size of effect. This being the case, little can be concluded from this study about any connection between the agent and displacement.

2.2.9. Displacement as an Experimenter Effect

In a variety of experiments in which he, as subject or experimenter, was the first to score the subject's calls for displacement, Sargent (1978b) observed numerous significant results on (-1) scoring, but none on (+1) scoring, leading him to suspect an experimenter effect.

The experiments varied considerably in terms of the ESP tasks involved. In two clairvoyance experiments examining the effects of sleep deprivation (Sargent 1978c), it was noted post-hoc that two of the three subjects in the first experiment had shown (-1) psi-missing in the second half of the experiment ($p < 0.01$ in each case). In the second study, which was aimed at replicating this effect, two of the four subjects showed psi-missing on the (-1) targets in the second half of the experiment, as predicted ($p < 0.03$ in each case), and a third subject showed significant (-1) psi-missing in the first half ($p < 0.01$). In an unpublished study of sleep

deprivation in which Sargent was the only subject, (-1) scoring was significantly higher under control conditions than under sleep-deprived conditions ($p<0.02$).

In a clairvoyance experiment in which a single talented subject attempted to guess the age and sex of persons shown in concealed pictures, the subject psi-hit significantly on (-1) targets ($p<0.007$), while there was no extra-chance scoring on (0) or (+1) targets (Sargent, 1977b). Significant (-1) effects were also observed in a study designed specifically to examine experimenter effects (Sargent 1978a). Ten subjects each completed 400 precognition trials in four runs in which the targets were a random sequence of the digits 1 to 5. Unknown to the subjects, each of their 40 runs of calls was scored against ten separate target sequences, and a computer program was then used to separate the target sequences into those expected to yield high scores, and those expected to yield low scores. Sargent then checked the percipients' responses against the target sequences, knowing which were high, and which low-aim sequences. It was predicted that subjects would score higher on the expected-high targets than on the expected-low targets, and this prediction was upheld only for (-1) targets. The psi task had been made complex in order to make the operation of the subjects' psi unlikely and so that any observed differences would be more easily attributable to the experimenter, whose task, from the standpoint of the observational theories, would have been relatively simple. However, Sargent noted that the relationship between task complexity and scoring is doubtful, and that his study was thus not a conclusive demonstration of an experimenter effect.

Sargent (1978b) pointed out that all of these significant (-1) effects had emerged in the absence of significant (0) effects, and that no (+1) effects had been observed at all. He felt that an experimenter-psi

hypothesis was more likely than an explanation for the (-1) effects in terms of psychological elements in the studies since the tasks involved varied so much between experiments. He suggested that the finding of (-1) effects in isolation might be related to Braud's 'spreading-thin effect' (Braud, 1978; Braud and Wood, 1977; Wood, Kirk and Braud, 1977) in which a given person during a given period of time is postulated to be able to achieve only a limited amount by means of psi. Sargent hypothesised that if the (-1) effects in his data were due to the operation of an experimenter effect limited in quantity, then (-1) effects should only appear when no significant (0) effects were present, and not when significant (0) effects were present (although such a demonstration would not support the experimenter-psi hypothesis directly, since displacement may by its nature be mutually exclusive with scoring on the intended target, and any exclusivity may have been due to the subjects in the various experiments, not the experimenter). He conducted 22 analyses for (-1) effects in several sets of data from his experiments which had yielded significant (0) effects, without finding any, although, as he pointed out, the absence of a (-1) effect would not constitute proof of the hypothesis. To test the prediction that (-1) effects should be observed only where there were no (0) effects, Sargent analysed data from another previous experiment (Sargent, 1977a) which had investigated the effects of amphetamine and diazepam on ESP. No (0) effects had been observed in the control and the placebo sessions, and so the first of the two control and placebo sessions were analysed in the hope that they would yield a result which could be replicated in the second sessions. The only significant result to emerge from the first sessions was that of significant (-1) psi-missing in the first half of the placebo session ($p(\text{two-tailed}) < 0.03$), and so data from the second control and placebo sessions were examined to see if this effect could be replicated; in the first

half of the second placebo session, significant (-1) psi-hitting was observed (p(two-tailed)<0.009), and this was again the only significant result. No significant (+1) effects of any sort were found. Thus there was support for the presence of a reliable (-1) effect in the section of the data in which no (0) effects were observed in this study, and thus some additional support of Sargent's experimenter-psi hypothesis.

As Sargent pointed out, the appearance of (-1) effects only in the absence of (0) effects in his experiments does not lend direct support to the experimenter effect hypothesis, but the repeated finding of significant (-1) effects and no (+1) effects is interesting. Since they occurred in the absence of significant (0) or (+1) scores, the (-1) effects cannot be accounted for in terms of a combination of high (0) or (+1) scores and non-random call sequences, but it is possible that they reflect differing frequencies of change of call following (0) successes and failures. This possiblity apart, the production of displaced scoring by an experimenter effect is an interesting proposition; as discussed in the introduction, Weiner (1985) has suggested that the discovery of unmotivated errors in ESP performance (such as displacement may turn out to be) could indicate limits on the action of psi, an issue which arose in the first place because of the possibility of experimenter effects. If displacement may itself appear as a result of an experimenter's influence, it could become difficult to tell whether displacement is a motivated error or not since the motivations of an experimenter are rarely as well-documented as those of the subjects in the experiment. This consideration would suggest that replication of displacement relationships across studies by a number of different experimenters would be desirable, since it seems reasonable to suppose that not all experimenters would be able to influence the results of their experiments more than their subjects, and that different experimenters

would not always be motivated to achieve identical results.

2.2.10. Summary and Conclusions

Despite the size of the body of literature reviewed, very little can be said to have been found for certain about between-trial displacement, so much so that it now seems questionable whether there is any sound evidence for even the existence of between-trial displacement as a phenomenon. Since many of the conclusions and recommendations which arise from the review of between-trial displacement also apply to the following section on within-trial displacement, a more detailed summary and discussion is deferred until the final discussion section.

2.3. Within-Trial Displacement

2.3.1. Introduction

Among those journals surveyed in this review, relatively few instances of within-trial displacement are reported in comparison to the number of between-trial cases, a situation which may be due partly to the formerly wider use of forced-choice than free-response techniques, and in particular to the recency of the widespread use of experimental designs in which a percipient must select the target on each trial from amongst a set of other, control targets; only in such studies could within-trial displacement appear.

The vast majority of evidence for the occurrence of within-trial displacement in a free-response setting is anecdotal (e.g., Moss, 1969; Roll, 1957-64; Stanford and Nelyon, 1975; Rogo, 1976; Markwick, 1983) and chiefly consists of observations that in the experimenter's opinion, subjects' mentations showed matches with control targets too accurate to be due to chance alone. However, Child and Levi (1980) give some striking examples

of a selection of spectacular matches between subjects' mentation records and pictures which were not members of the judging set for the subjects' trials, but were chosen for control purposes up to several years later. Indeed, given the amount and variety of imagery which subjects can produce in a free-response trial, and the complexity of target material often used, it would be surprising if spurious coincidences which looked like displacement did not turn up from time to time, and so some caution would seem advisable in interpreting ancedotal reports as strong evidence for displacement.

As with between-trial displacement, within-trial displacement has tended to be noted in those experiments where scoring on the intended target was below chance; it is possible that this tendency has less to do with a real link between intended and displaced scoring than with subjects or experimenters looking harder for evidence of matches with control targets when the intended target has not been correctly identified rather than admit to the absence of ESP on a trial. Another reason for an apparent link between psi-missing and displacement may be that if displacement did occur, it could give the statistical appearance of psi-missing without there being any avoidance of the target, depending on how the displacement occurred.

As an example, consider the case of an experiment in which the target sets consist of four pictures, namely, the target picture and three contrasting control pictures. Each picture would be ranked according to its correspondence to the percipient's mentation, and overall scoring would be determined by comparing the mean rank assigned to the target with that expected by chance. In the case of a target set containing four pictures, mean chance expectation would be a rank of 2.5 (being the average of 1, 2, 3, and 4). If the percipient described the target perfectly on every trial, the

mean target rank would be 1.0. However, if the percipient described instead one of the non-target pictures perfectly on each trial, the first rank would no longer be available for the target, and the mean target rank would fall to 3.0 (the average of 2, 3, and 4), that is, a below-chance value. If the percipient described all three non-targets perfectly, the mean target rank would drop to 4.0. Thus, in general, displacing to one or more non-targets would result in scoring on the intended target being below chance, even although information concerning the target need not have been suppressed. However, it is not clear from the research conducted so far whether when (or if) displacement occurs it involves the description of one non-target, or several, or the target picture as well as the non-targets; this would be an interesting question for future research.

However, an advantage of within-trial displacement in the free-response situation is that there is a method of statistical determination of scoring on the intended and control targets independently of each other which is relatively straightforward. Two papers have been published in which the authors have attempted to develop a measure of free-response performance taking within-trial displacement into account. In the first, by Palmer, Bogart, Jones and Tart (1977), independent judges rated the similarity between the subject's mentation transcript for each trial against two sets of pictures, one being the target set used by the subject, the other being a control set which the subject had never seen. The judges were blind as to which set was which. A 'displacement score' was calculated by subtracting the average correspondence rating of certain control sets from the average rating given to the target set; thus the 'displacement score' was a measure of the extent to which the pictures in the target set as a group stood out above the control sets and was not independent of the score on the target picture itself. This would not be a problem if

displacement is simply target-directed scoring gone astray, since the 'displacement score' here can be regarded as a measure of ESP scoring in the trial as a whole, which would be expected to correlate uniformly with psychological variables regardless of whether the percipient had described the target or one of the controls. However, since it is questionable whether displacement is misdirected psi or motivated error, an adaptation of this analysis by Child and Levi (1980) would seem preferable.

Child and Levi compared separately mean target ratings and mean ratings of control pictures in target sets to mean ratings of pictures in control sets, yielding separate scores for target pictures and for target set control pictures; any significant deviation of the latter from chance would indicate displacement. Child and Levi point out that care should be taken in interpreting the results of such an analysis, since if a set of pictures is constructed so that the pictures within it are as contrasting as possible (as is usually the case in such experiments), scores on pictures within each set will tend to be anti-correlated. Thus, displacement onto controls might give the appearance of psi-missing on the intended target, and vice versa. However, this is unlikely to be a serious problem because of the complexity of most target material used in free-response experiments and the variety and quantity of percipients' mentation, which would tend to overwhelm any superficial contrasts; even ratings of 'opposites' in the relatively simple binary-coded Maimonides slides (Honorton, 1975) in Child and Levi's experiment gave a negative correlation of only -0.19.

Given the relative simplicity of interpreting a displacement analysis in this context, and the frequency of anecdotal reports of within-trial displacement in the free-response literature, it is unfortunate that only the two studies mentioned above have involved a statistical analysis for displacement. As discussed earlier, anecdotal reports of a possible link

between psi-missing and displacement are not persuasive , and little is likely to be gained by reviewing such studies. However, at this stage of research, it may be worth examining suggestions of relationships between psychological variables and anecdotal, as well as statistical indications of displacement to provide suggestions for future research, and so it was decided that, in addition to discussing those studies with statistical evidence of displacement, those studies in which displacement was suspected to have occurred and discussed with respect to other variables would be included, and the journals surveyed would include Research in Parapsychology, in addition to those already listed. However, even this flamboyant gesture increases the number of studies covered in this section to a total of four. Each study will be discussed in turn.

2.3.1.1. Palmer, Bogart, Jones and Tart (1977)

Palmer et al conducted a ganzfeld experiment in which ESP scoring was investigated in relation to whether the subjects had attended a biofeedback or an altered states of consciousness class, whether the agent viewed the target, and in relation to a number of measures of the percipient's reaction to the ganzfeld stimulation. According to the two independent judges, scoring on the target was significantly below chance ($p(\text{two-tailed}) < 0.05$), and there were several significant relationships between target scoring and the other variables. The mean 'displacement score' (that is, the difference between the ratings given to the whole target set and to the control sets) for the judges combined was not significantly different from chance, but the judge who had experience of the ganzfeld and more college coursework dealing with distortions of imagery than the other judge gave a mean displacement score which was significantly above chance ($p(\text{two-tailed}) < 0.02$). However, there were no significant

relationships between the displacement scores and any of the other variables. Even if the displacement was a genuine effect (bearing in mind that the analysis was post-hoc and is only just significant at the 0.05 level when corrected for the use of two judges), the absence of significant relationships with other variables for the displacement scores when such relationships were present for scoring on the intended target is difficult to interpret. It could indicate either that scoring on the target and displaced scoring did not correlate in the same way with other variables, and so a measure combining the two types of scoring revealed no significant effects; or that the two were in part truly or artefactually anti-correlated and combining the two scores in one measure tended to cancel out any effect within each trial; or that the displacement scoring was spurious and the use of the 'displacement score' simply introduced noise into the analyses.

2.3.1.2. Child and Levi (1980)

Child and Levi had eight independent judges rate the correspondence between each mentation report and a target and control set of pictures for a ganzfeld study which had yielded significant psi-missing according to the percipients' own ratings. The judges rated the control pictures in the target sets as more similar to the mentation reports than the targets ($F=9.03$, 1,13df, $p<0.01$). In order to determine whether this result was due to the percipients suppressing information relevant to the target, or displacing to the controls, Child and Levi compared the similarity of the percipients' mentation to the target and non-targets in the target sets with its similarity to the control sets. They found that the mean correspondence rating of the non-target pictures in the target set was higher than the mean rating of the pictures in the control set, although not significantly so ($F=3.38$, 1,13df, p(two-tailed)$=0.09$). The target pictures were

on average rated lower than the control pictures, but not to a significant degree (F=1.54, 1,13df, p(two-tailed)=0.24). It is not clear from these results whether displacement to the controls took place, nor to which hypothesis to attribute the psi-missing on the target pictures.

Child and Levi were also interested in whether psi-hitting when it occurs is due to the percipient accurately describing the target, or perhaps to a combination of describing the target while suppressing information relevant to the non-targets in the set. Six independent judges judged a body of data suggestive of psi-hitting, again comparing mentation transcripts to target sets and control sets. Although the mean rating of the targets was considerably higher than target set non-targets and control set pictures, the mean ratings of non-targets and control set pictures were very similar (F=0.04, 1,13df, p(two-tailed)=0.85), giving no support to the suggestion that psi-hitting might in part be achieved by suppression of information relevant to the non-targets.

2.3.1.3. Stanford and Neylon (1975)

In a ganzfeld clairvoyance experiment reported as a conference abstract, Stanford and Neylon found that according to the percipients' ratings, scoring was non-significantly below chance. ESP scores were dichotomised at the median, and the twenty subjects in the higher-scoring group were found to underestimate the time they had spent in the ganzfeld to a significantly greater degree than the twenty subjects in the lower-scoring group (t=2.31, 38df, p(two-tailed)<0.03). Those subjects who underestimated time in the ganzfeld performed more positively than those who overestimated, who psi-missed. Stanford and Neylon noted that displacement seemed to have occurred in the study, and suggested that those subjects who tended to displace were those who showed no time

contraction, and that the lack of time contraction may have indicated that these subjects had not found the ganzfeld pleasant and absorbing and may therefore have 'looked ahead' in time to the end of the session when he or she would see the whole target set, introducing the possibility of displacement. They also suggested that the lack of an agent may also have contributed to the occurrence of displacement, since an agent may serve to 'focus' the percipient's attention on the target.

2.3.1.4. Rogo (1976)

Rogo reported that an apparently gifted subject, Miss Claudia Adams, seemed to show a great deal of displacement in a series of GESP ganzfeld trials, describing control targets or magazine pictures which the agent looked at during the session. He noted that these apparent displacements usually came at the very beginning and end of the session, and suggested that the subject's ESP might be most active at these points when no target was being presented to the agent and thus described the first available object of her ESP. In an attempt to overcome this seeming tendency to displace, Rogo changed the procedure so that the agent began viewing the targets as soon as the percipient reported her first image, and cut the duration of the session from 35 to 7 minutes, apparently with some success. However, even if the displacement observed in this study was genuine, it is not clear whether Miss Adams was informed that the changes in procedure were hoped to prevent displacement, which information may itself have contributed to any change in her performance.

2.3.2. Summary and Conclusions

In summary, it would seem that little has been learned about within-trial displacement in a free-response setting so far, although Child and Levi have developed an analysis suitable for examining separately

scoring on the intended and control targets, and Stanford and Neylon have suggested that investigation of the role of the agent and the percipient's reaction to the length of the ganzfeld session with respect to displacement may prove worthwhile. This latter suggestion may relate to Rogo's observation that displacement seemed to occur at the very end of the session, since if the subjects began their trials well, and only began to lose interest after some time in the ganzfeld, then they might be expected to begin by hitting on the target and progress to the controls towards the end of the session; it would be easy for future researchers to incorporate an analysis for this effect once they had analysed for displacement, and some interesting results might be found.

2.4. Discussion

Probably the first question which arises as a result of this review is, 'does displacement exist?' Although the concept of displacement is familiar to researchers, and displacement analyses have appeared in many papers, several issues raised during the course of the review call into doubt whether displacement as a phenomenon is as well-established as has been believed. Firstly, very few researchers have been aware of effects related to scoring on the intended target which could give the appearance of displacement where none exists (such as the combination of extra-chance scoring on the intended target with non-randomicities of the call sequence, and the differential frequency of changing guess depending on whether the call on the intended target was successful), and this is a major problem in interpreting the results of all but a handful of studies presented here. A second problem is that of the post-hoc nature of many of the analyses for displacement reported, which leads to the danger of seemingly positive evidence of displacement being merely the result of analysing only those

chance fluctuations in scoring noticeable enough to yield a significant effect. A related problem is that of overanalysis; many of the significant displacement results cited disappear when corrected for being the best of several analyses conducted on targets of different displacements, and this problem is exacerbated by the apparent tendency to start analysing for displacement only after significant effects have failed to show up on the intended target. The possibility of a bias against even mentioning the results of failed displacement analyses in published reports is a real one, particularly in the earlier literature when less emphasis was placed upon the necessity for fully reporting all results, whether significant or not. Finally, the lack of consistency among the results of studies examining the relationship between displacement and other variables could be taken as an indication that there is no real effect for other variables to relate to, although there are other possible explanations for this absence of solid findings.

The sections of the review dealing with the relationship between displacement and other variables yielded no consistent effects, but may have been useful in bringing to light some of the limitations of displacement research so far and in indicating how very little is known as yet about the nature of displacement. It is possible that research in the area has made so little progress because it has almost always been pursued as a side-issue or afterthought, with correspondingly little systematicity or attention to methodology. Two main aspects of experimentation have been responsible for the problems in interpreting the results of the various studies, namely, the ways of using analyses for displacement itself, and of choosing and dealing with those variables thought to relate to displacement.

Most of the problems with analysing for displacement in the past

have already been dealt with, and recommendations which naturally arise are for more careful analyses which are sensitive to artefacts, the inclusion of details of scoring on targets of other displacements so that their possible contribution to artefactual results can be more easily assessed, and the need for planned and systematic work rather than post-hoc and casual analysis.

The second category of problems, that of selecting and dealing with variables thought to relate to displaced scoring, reveals the need for a more clearly-defined research strategy than has existed previously. The section of the review covering the relationships between displacement and other variables yielded no consistent findings, but several limitations of the research reviewed may have contributed to this situation. The first problem is that few of the variables examined were those whose relationship to scoring on the intended target has been well-established, and so even when significant relationships between such varibales and displaced scoring were found, it was difficult to know whether the results suggested that displaced scoring behaved like misdirected scoring on the target, or like some kind of motivated error. A large part of the reason for not selecting familiar variables was probably that the research in question was not directed principally towards examining displacement, and so variables were not chosen with a view to testing the various models of displacement. In future displacement research, however, it would seem advisable to examine variables with a relatively well-established relationship to scoring on the intended target (the 'sheep-goat' variable is probably among the best candidates (Palmer, 1978)).

Secondly, some sensitivity is likely to be required to the necessity for distinguishing between variables which might be expected to cause displacement, and those which might correlate with displaced scoring. To

cite an example already discussed, it may be that impatience causes displacement, and other factors determine the magnitude and direction of the scoring once it has been displaced. Thus, an attempt to apply a correlative analysis between displaced scoring and impatience would show no effect unless all subjects were inclined to score in one direction, and even then, any effect would be weak. A more appropriate form of analysis in this case would be to divide subjects into groups of those who were impatient, and those who were not, and test whether stronger relationships were found with scoring on the intended or displaced targets with other variables in both groups. If stronger relationships were found with displaced scoring than with scoring on the intended target in the impatient group, and stronger relationships with scoring on the intended target than with displaced scoring in the patient group, then impatience would seem to be a causative, not correlative variable. Few researchers have made this distinction clear with respect to displacement, and part of the reason for the lack of consistent results may have been the application of inappropriate analyses.

A related point is that it seems reasonable to suppose that those variables most promising as predictors for displacement could be those which reflect some aspect of the percipient's attitude which could make him or her wish to avoid the target or displace. Suitable candidates for future research would therefore be the sheep-goat variable; patience versus impatience; tension versus relaxation; and variables which might, in an experimental setting, be expected to give rise to some sort of approach-avoidance conflict. Finally, consistency in the measurement of the various psychological variables involved is clearly desirable, as is awareness of how the same experimental manipulation could interact with individual differences. The study of Schmeidler (1985), in which each

percipient set his or her own preferred rate of testing as a baseline for changing the rate of call, is an example of a design suitable for allowing for individual differences.

It is hoped that at least some of these suggestions will be incorporated in future work. Few, if any, parapsychological constructs stand or fall according to whether displacement truly exists; there is evidence from other areas of research which bears upon the validity of precognition and retrocognition, and there are no theories which suggest that percipients should only be able to guess the intended experimental target and nothing else. However, if displacement does exist, then it is important that it should be recognised so that it can be researched appropriately as a phenomenon of interest; so that measures of scoring can be developed which avoid confusion between psi-hitting or psi-missing on the intended target with displacement, thereby reducing a potential source of 'noise' in target-related data; and so that, if necessary, research can be directed towards developing methods of preventing displacement as a step towards reliable experimentation.

2.5. Notes

1. Palmer's 1978 review of ESP functioning includes consistent missing as a form of within-trial displacement on a forced-choice task. Consistent missing is the tendency to call a particular incorrect symbol when another particular symbol is the target; for example, when the target is a star, the percipient might consistently call 'cross'. However, it does not seem appropriate to designate consistent missing as a form of displacement since it is the true target which determines the response, and not some alternative array of targets. The exclusion of consistent missing as a manifestation of displacement is supported by Timm (1969), Kelly,

Kanthamani, Child and Young (1975) and Kanthamani and Kelly (1975), who suggest that consistent missing is the result of a systematic error in recognition of the real target; this suggestion is backed up particularly by Kelly et al, who found similar confusion matrices when their percipient, Bill Delmore, attempted to guess the identity of playing cards hidden from view and presented tachistoscopically.

2. The numerical notation for displacement was originally introduced by Soal (1940), who, following Carington's (1940) policy, denoted forward displacement as negative, and backward displacement as positive. Only Russell kept this convention, while all others since have followed Thouless (1942) in denoting forward displacement as positive and backward displacement as negative, since it seemed more reasonable to refer to future time as positive and the past as negative.

3. An independent judge compared each of the fifty target drawings with all of the response drawings from the fifty trials, assigning either one or no points to each target-response pairing according to the similarity between them. Carington compiled a 50 x 50 table, the rows from top to bottom being the fifty target drawings in order of presentation, the columns from left to right being the fifty successive trials on which the percipients attempted to reproduce the target. Each cell of the table contained the number of drawings made on a certain occasion which had been assigned a point for their correspondence to the target drawing for a certain occasion. The cells in the leading diagonal thus represented non-displaced performance (when target and response were made on the same occasion); cells in the adjacent diagonal to the upper right represented performance on (-1) displacements (when the target was displayed one trial after the response), the next adjacent diagonal represented (-2) displacements, and so on. Similarly, the diagonals in the

left area of the table represented positive displacements. Carington divided the ninety-nine diagonals in the table into eleven groups of nine and calculated a value of $(O-E)/E^{1/2}$ for each group. However, because the expected number of points in each cell was calculated on the basis of the observed number of points in other cells, an excess of points in one part of the table could have caused an apparent deficit elsewhere, and vice-versa. In this way, a symmetrical plot of $(O-E)/E^{1/2}$ against displacement, peaking at the central value of (0) displacement as obtained by Carington could have been a result of an excess of points at the top left and bottom right corners of the table, and thus have no relevance to the displacement question. Since Carington did not reproduce the table, it is not possible to investigate this possibility.

4. To allow for comparison of displacement effects between studies, all probability values are uncorrected for multiple analysis within each study. In addition, probability values given for analyses testing the likelihood of a displacement score deviating from chance have been made two-tailed, wherever possible, so that there may be consistency between those studies forced to use a two-tailed test when displaced scoring was significantly below chance, and those which were not. Probability values marked with an asterisk have been calculated by the reviewer.

5. Two methods of analysis were proposed in Pratt's paper, one by Greville (1951) in association with Walker, and another by Robbins. However, Greville (1954) later pointed out a problem with Robbins' method and so only the results obtained by the Walker-Greville method are given here.

6. Indeed, only West (1953) has since carried out an analysis for the reinforcement effect, unfortunately using the analysis suggested by Robbins which was not discovered to be invalid until 1954 (see Note 5).

7. Abbot's Table 5, from which these figures are taken, showed a number of displacement trials inconsistent with the number of trials on the intended target. The probability values given here have been recalculated on the assumption that the numbers of trials on the intended target were correct.

CHAPTER 3

EXPERIMENT ONE: THE POSSIBLE 'DIRECTIVE' ROLE OF THE AGENT

3.1. Introduction

The principal aim of this first study was to examine the role of the agent to investigate in what, if any, sense the agent might serve a directive function for the percipient's ESP. As discussed in the introductory chapter, an assumption which seems to pervade much of the experimental literature is that the agent's role in GESP is to act as a kind of 'landmark' for the percipient. Although good ESP scores appear to be obtainable with clairvoyance procedures (when no agent is with the target), attempts have been made to look for differences in scoring under clairvoyance and GESP conditions, with inconsistent results; however, as Palmer (1978) points out, a possible explanation of this inconsistency may be that the results might depend upon who is selected as the agent. Reviewing research comparing the efficacy of various agents, he concludes that the general trend of results seems to indicate that with agents who are well-known, or well-liked by the percipient, scores tend to be higher than with agents who are strangers, or disliked by the percipients.

There may be a reason for supposing that any difference in the percipient's performance with and without an agent would be more likely to show up using the ganzfeld technique than otherwise. One of the reasons given by Honorton and Harper (1974) for expecting the ganzfeld to be psi-conducive was the possibility that exposure to the ganzfeld might help establish an affective link between percipient and agent or experimenter, increasing the percipient's desire for communication; Bertini, Lewis and Witkin (1972), in their non-parapsychological study of the effects of the ganzfeld, had already noted that some subjects developed a preoccupation

with the experimenter during the ganzfeld session, and suggested that the ganzfeld might promote a process akin to transference.

Unfortunately, very few ganzfeld studies so far have compared scoring under clairvoyance and GESP conditions. Raburn and Manning (1977) obtained highly significant scoring in a GESP condition in which none of the percipients had met the agents before the experiment ($p<0.00003$), but only chance-level scoring in the clairvoyance condition, the difference between the two being significant ($p<0.05$). The percipients were unaware of which condition was operating at the time. In an unpublished study, Sargent, Milton, Payne and Bennet (1982) obtained similar results with percipients also blind as to the condition scoring significantly above chance in the two GESP conditions ($p<0.001$ in both cases) and close to chance in the clairvoyance condition, the difference between scoring in the GESP and clairvoyance conditions again being significant ($p<0.05$). In this study, the percipient worked with the same agent for all three of his or her sessions, and all but one had met the agent at least once before the first trial. Several subjects had worked with their agents in previous experiments, and many were friends.

On the basis of these two studies, it would seem that there is some indication that higher scoring is achieved in the ganzfeld under GESP conditions than under clairvoyance conditions; while the percipients knew their agents quite well in the study of Sargent et al, this was not the case for the pairs in the Raburn and Manning study; however, no detail is given concerning interactions between percipient and agent once the study began, and so it is difficult to assess any possible effects of the percipient-agent relationship in this case.

Both Stanford and Neylon (1975) and Rogo (1979) have suggested that the presence of an agent may help to prevent the occurrence of

displacement. Stanford and Neylon, noting that some displacement seemed to have occurred in their ganzfeld clairvoyance study, suggested that in a GESP procedure, the presence of an agent, with whom the percipient might develop a transference-like relationship due to the ganzfeld stimulation, might serve to focus the percipient's attention on the target. Rogo, on the basis of some apparent cases of displacement in his own ganzfeld studies, has also suggested that the agent serves a directive purpose, and that percipients may be more likely to displace without an agent. Displacement was suspected to have occurred in the clairvoyance, but not the GESP condition in a ganzfeld study by Sargent, Milton, Payne and Bennet (1982), which would tend to support the suggestions of Stanford and Neylon and of Rogo. However, an interesting aspect of Rogo's account of the work in which displacement seemed to occur is that on some trials, displacement occurred to some experimental target from another trial about which the agent claimed to have been thinking at the time. Any directive function which the agent might fulfill could therefore involve the agent's attention as a guide, rather than his presence as such; thus, an agent may help to prevent displacement if he or she only attends to the target, but may contribute to the occurrence of displacement if he or she also attends to the controls.

The main hypothesis under test in this study was, then, that the agent's attention to the package containing the target guides the percipient's ESP, such that, in the ganzfeld with an agent known to and liked by the percipient, scoring would be higher with than without an agent. A secondary hypothesis was that, if all of the pictures in the judging set were with the agent during the trial, displacement would be more likely to occur than if the target only was with the agent, because the control pictures would also be attended to by the agent during the trial.

In order to test these hypotheses, a within-subjects design was used with three conditions; although an agent was present in two of the conditions, he or she never saw the target, which was always enclosed in a sealed opaque envelope. In the first condition, an agent remained with the target in an isolated room during the ganzfeld session; in the second condition, there was no agent, and the target remained in an isolated room during the session; and in the third condition, the agent remained in an isolated room with all of the pictures in the judging set, both target and control pictures. The percipients and the experimenter were always blind as to which condition was operating. It was predicted that overall scoring would be higher in condition (1) than in condition (2), and that displacement might occur in condition (3), but not in conditions (1) or (2).

The possible influence of the agent's psychological state on performance was examined by having agents complete at the end of each session for which they were present a questionnaire measuring their mood, motivation, the degree to which they had found the session interesting, and the percentage of the session for which they had been able to concentrate on the package containing the target. Each questionnaire measure was correlated with the rank assigned to the target on each trial, but no predictions were made concerning the outcome of this analysis.

To allow for the possibility that scoring might manifest itself on a control picture as well as on the intended target, the correspondence rating given to the picture most similar to the mentation on each trial was also correlated with the agent state measures, in order to see if the strength of association to the target which may have been the object of the percipients' responses correlated with the agent's state. Again, no predictions were made as to the outcome of these analyses.

Correlations between various measures of the percipient's attitude

towards each picture in the judging set, and the correspondence ratings assigned to each picture were examined, in order to investigate whether the percipient's attitude towards the pictures in the set might determine to which picture he or she would displace, if displacement occurred.

Finally, some predictions were made concerning scores on imagery which the percipients reported as being unrelated to the previous image; not recognisable as being related to the percipient's memories; and surprising. Following a suggestion from Stanford's conformance behaviour model, as discussed in the introductory chapter, it was predicted that the percipients would score better on unrelated than related images; following the work of Sargent, Bartlett and Moss (1982), Sargent, Moss and Bartlett (1982) and Sargent, Milton, Payne and Bennet (1982), it was predicted that scoring would be better on surprising than unsurprising imagery, and on novel than memory-related imagery.

For all the analyses, the ratings and rankings assigned by two independent judges to the correspondence between the subjects' mentation reports and judging sets for each trial were used, rather than those of the subjects. There are both advantages and disadvantages in using the data of independent judges as opposed to the percipients' data; the main disadvantage is probably that the independent judge has only the percipient's verbal description of his or her imagery, as compared to the percipient's direct experience and memory of all the details of the mentation, some of which may contain information necessary to identify the target. An advantage of using an independent judge, however, is that such a judge is more likely to be able to judge correspondences calmly and rationally than a percipient just emerged from the ganzfeld, who may still be slightly disoriented and drowsy, and hence less objective and possibly more likely to be swayed by preferences for the various pictures in the set.

Such advantages may be especially strong when the percipients have had no experience of the ganzfeld, and no familiarity with the judging procedure, and the independent judges are experienced in this way. Since two people experienced both as ganzfeld percipients themselves and as independent judges of ganzfeld data from other studies were available, while most of the percipients were new to the ganzfeld, it was decided to use the independent judges' data for the purpose of analysis. The two judges' data were analysed separately, in case the judges differed in their sensitivity to target-related correspondences; some justification for this separate treatment of their data comes from a ganzfeld study by Palmer, Bogart, Jones and Tart (1977), in which the data of the independent judge who had previous experience of the ganzfeld, and more college coursework dealing with distortions of imagery than the other judge, showed significant evidence of displacement, while the data of the other judge did not.

3.1.1. Planned Analyses

To summarise, the analyses planned for this study were as follows (each analysis was carried out separately for each judge).

(i) It was predicted that scoring in condition (1) would be significantly higher than scoring in condition (2), according to a comparison of the sum of target ranks assigned in the two conditions using the sum-of-ranks analysis of Solfvin et al (1978).

(ii) It was predicted that displacement would occur in condition (3), but not in conditions (1) and (2); it was decided that evidence of displacement would be demonstrated if the average correspondence ratings assigned to the three control pictures in the target set were significantly higher than the average correspondence ratings assigned to the four pictures in a control set never seen by the percipients, according to a

related t-test.

(iii) To examine the relationship between scoring on the target and the agent's psychological state, it was planned to calculate Spearman correlation coefficients for the relationship between scores on the four agent questionnaire measures and the rank assigned to the target on each trial, separately for conditions (1) and (3) (in which an agent would be present).

(iv) To allow for the possibility that scoring might manifest itself as displaced scoring, it was also planned to calculate Pearson correlation coefficients for the relationship between the agent questionnaire measures with the highest correspondence rating assigned to a picture on each trial, separately for conditions (1) and (3).

(v) In order to test whether a percipient's attitude towards the pictures in the set determined to which pictures he or she would displace, it was planned to calculate Pearson correlation coefficients for the relationship of the five attitude measures to each judge's overall rating of correspondence for each picture.

(vi) A final analysis was planned to compare scoring on the basis of a number of categories of mentation to scoring on the remaining mentation; full details of the planned analysis, and of an analysis which replaced it when it was discovered to be invalid, are given in the results section.

3.2. Method

3.2.1. Design

A within-subjects design was used with three experimental conditions (one condition in each of three trials) and a pretest trial to familiarise subjects with the experimental procedures. A double-blind

operated so that the agent did not learn the outcome of any of the percipient's trials until the end of his or her part in the experiment, and so that neither experimenter nor percipient knew which condition was underway in any trial. The order in which the percipients did the three conditions was counterbalanced to avoid order effects, and the percipients were pseudo-randomly assigned to one of the six possible orders by a person otherwise independent of the experiment, using a method specified by the author.

3.2.2. Subjects

Twelve percipients, eight males and four females, ranging in age from 19 to 35 years old, each took part in one pretest and three experimental trials, with the exception of one subject already experienced in the ganzfeld, who did not take part in a practise trial. All were volunteers, and were drawn from among the author's friends and acquaintance; all were either undergraduate or graduate students.

Eleven of the subjects each acted once as percipient and once as agent in the study, although not always in the same pairing. One subject acted only as percipient, and one, a male, acted only as agent. All percipient and agent pairs for each trial had been introduced in a social setting away from the laboratory before the experiment began, in order to promote a good relationship between the two; before the experiment, the experimenter had suggested the names of a number of the people who were available to act as agents, and allowed the percipient to choose an agent. All subjects who took part were at least open to the existence of ESP; this restriction of subjects to 'sheep' was made so that any scoring effects within the study would be more likely to be directionally consistent. All except two of the percipients had never had experience of the ganzfeld

before.

3.2.3. Targets and Target Selection

Twenty-two target sets, each containing four pictures, were used in the study. The pictures, which had been selected by the author, were black and white and colour postcards of paintings, cartoons, illustrations and photographs, and the sets were composed so that the pictures in them were as contrasting as possible in terms of style and content. No pictures with a negative emotional tone were included, both for reasons of ethics and the practical reason that the use of unpleasant targets might result in avoidance; in addition, pictures with erotic content were not included, since it was felt that percipients might be embarrassed about reporting erotic imagery if target-related imagery occurred. An example of a target set is contained in Appendix 1.

So that no sensory cues, such as fingerprints or other markings made on the target picture by the agent, would be available to the percipient or independent judges during the judging process, duplicate target sets were made for the agents to use. Each picture in the agent's set was contained in a sealed, opaque envelope, while all four of the pictures in the percipient's set were contained in a single envelope. Each set was assigned a set number, from 1 to 22. Each picture in the agent's set was identified by a letter A, B, C or D; the corresponding pictures in the percipient's set were identified by a different, randomly-applied code unknown to either percipient or agent, so that there would be no possibility of the agent cheating by, for example, thumping the laboratory wall three times for picture C, although some other simple, and therefore relatively unobtrusive code could have been used if the percipient and agent had developed, for example, a content-related code before the trial, such as two

knocks indicating the presence of people in the target, and so on. However, in order to be heard by the percipient during the trial, any raps or knocks would have had to have been loud enough for the percipient to hear them over the white noise, in which case the experimenter would have been unlikely not to have noticed them also; the experimenter would have been able to hear (as pre-tested) if the percipient had lifted either headphone earpiece during the session, or if the percipient had attempted to remove the ping-pong balls, or to leave the reclining chair. A better opportunity to cheat, however, would have been available when the experimenter briefly left the laboratory at the end of each session, at which point the agent could have visited the percipient. Given that the percipients were mostly friends of the experimenter, with no ostensible investment in cheating, it is arguable that with these subjects, cheating was unlikely. Nevertheless, further precautions were taken in the second experiment, which are discussed in the next chapter.

The target set and target to be used for each trial were selected according to a procedure specified by the author by a person otherwise unconnected with the experiment, who used numerical codes to translate the outcome of a series of coin-flips into an entry-point into a random-number table (Rand Corporation, 1955), and other codes to translate the ensuing sequence of random numbers into numbers and letters identifying target sets and targets. A constraint was applied to this otherwise random procedure such that no percipient ever saw the same set of pictures twice. Having made these selections, the randomiser enclosed slips of paper identifying the target set and target each into a separate opaque envelope bearing the name and trial number (1, 2, or 3) for each percipient, and sealed the envelopes. All target sets and designations were kept locked away by the experimenter until each trial was ready to begin.

3.2.4. Setting and Apparatus

The experiment was conducted using three rooms in the Psychology Department at Edinburgh University. The Parapsychology Laboratory, a large office, was used as the ganzfeld stimulation room, and contained a comfortable reclining chair on which the percipient lay during the ganzfeld stimulation. On a table next to the chair was a flexi-pose lamp fitted with a 60 watt red bulb. A tape-recorder, which relayed white noise from a tape through comfortable headphones to the percipient, was also on the table, as was a sensitive microphone which relayed the subject's verbalisations to a second tape-recorder, contained in a cubicle in the corner of the laboratory, and separated from the laboratory by a door. The subject's verbal report was taped on this recorder, as well as being concurrently relayed over headphones to the experimenter (the author), who was also in the cubicle.

The author's office, which was separated from the laboratory by another room, contained the target set, target and condition designations in their sealed envelopes. A third room, three floors down from the laboratory, served as the agent's room during the sending period.

3.2.5. Procedure

At the beginning of each trial, the experimenter met the percipient and agent in the laboratory and offered them refreshments. On the first experimental trial, the experimenter explained to both subjects that all three sessions involved a clairvoyance procedure, with minor variations, and stressed that the percipient and agent should not discuss any aspect of any trial, until all were over. Both practise and experimental trials followed the same basic procedure, except for full feedback being given to both parties after the practise trial which was conducted to familiarise both subjects

with the situation.

When the percipient and agent seemed to be at ease and ready to begin, the experimenter escorted the agent to her office and showed him or her the sealed envelopes containing the target set, target, and condition designation for the trial, and the pile of sealed envelopes in a box containing the target pool of pictures, each identifiable by a number and letter on the envelope. Starting two stopwatches simultaneously, the experimenter handed one to the agent and asked him or her to open the envelope labelled 'CONDITION' and to follow the instructions it contained. She then left the office before the agent opened the envelope. As well as leading the agent through those aspects of the procedure, some of the instructions were concerned with preventing the experimenter from being able to tell which picture had been the target before the end of the trial, and which condition had been operating during the trial, before the end of the experiment. Thus it was important that only the target envelope should be missing from the box at the end of the trial, and that its contents should be inaccessible to the experimenter during the trial; and that the contents of the agent's room should always be the same after each trial.

The instructions for the agent in conditions (1) and (2) began as follows:

> Open the envelope labelled 'TARGET SET' and take out the slip of paper it contains. Place this slip of paper on the desk and leave it there. Open the envelope labelled 'TARGET' and take out the slip of paper it contains.
>
> Open the box containing the large envelopes and take out the one labelled with the target set number and target letter. For example, if the target set slip reads 'Target set 09' and the target slip reads 'The target is C', take the large envelope labelled '09C'. DO NOT OPEN IT. Lock the box.
>
> Leave the office, taking with you the stopwatch, the key to the box, the target slip (reading A, B, C, or D), the large envelope containing the target picture, and these instructions. Check that you have left the target set number slip on the desk.

The instructions for condition (1), in which the agent remained with the target only, continued:

> Go to the agent's room downstairs. Put the experimental materials out of sight behind you, and sit down and wait until the stopwatch reads 15 minutes.
>
> Now place the large envelope containing the target picture on the table in front of you. DO NOT OPEN IT. Try to concentrate, as far as possible, on the envelope until the stopwatch reads 45 minutes. LEAVE THE STOPWATCH RUNNING. Please complete the attached questionnaire.
>
> Now place this sheet of paper in the empty envelope attached, seal it and sign it over the seal. Leave all the experimental materials behind you and leave the department.

The instructions for condition (2), in which the target remained in the room with no agent, continued:

> Go to the agent's room downstairs. Place the large envelope containing the target on the table and place everything else where it would be out of sight behind you if you were to sit at the table. LEAVE THE STOPWATCH RUNNING. Now place this sheet of paper in the empty envelope attached, seal it and sign it over the seal. Leave all the experimental materials behind you and leave the department immediately, before 15 minutes have passed on the stopwatch.

The instructions for condition (3), in which the agent remained in the room with both target and control pictures, read as follows:

> Open the envelope labelled 'TARGET SET' and take out the slip of paper it contains. Place this slip of paper on the desk and leave it there.
>
> Open the box containing the large envelopes and take out all four envelopes bearing the target set number. For example, if the target slip reads 'Target set 09', take the four envelopes labelled 09A, 09B, 09C, and 09D. DO NOT OPEN THE ENVELOPES. Lock the box. Leave the office, taking with you the stopwatch, the key to the box, the four large envelopes containing the pictures, these instructions, and the envelope labelled 'TARGET'. DO NOT OPEN THE ENVELOPE LABELLED 'TARGET' YET.
>
> Go to the agent's room downstairs. Put all the experimental materials out of sight behind you and sit down and wait until the stopwatch reads 15 minutes.
>
> Now open the envelope labelled 'TARGET' and take out

the slip of paper it contains. Place the large envelope it specifies on the table in front of you. DO NOT OPEN IT. For example, if the target set slip reads 'The target is C', place target C in front of you. Try to concentrate, as far as possible, on the envelope until the stopwatch reads 45 minutes. Now please complete the attached questionnaire. Relax and wait for a further 10 minutes. LEAVE THE STOPWATCH RUNNING. Leaving all the other experimental materials behind you, take the key to the target picture box and the three large envelopes containing the pictures which were not the target back to the office. Replace the envelopes in their usual order in the box, lock it and return to the basement taking the key to the box with you.

Now place this sheet of paper in the empty envelope attached, seal it and sign it over the seal. Leave all the experimental materials behind you and leave the department.

The questionnaire completed by the agent is contained in Appendix 2.

After leaving the agent in her office, the experimenter returned to the laboratory and locked the door. The percipient was seated in the reclining chair, and a foam mask into which was set a pair of halved ping-pong balls was fixed to the percipient's face by means of surgical tape. The mask was positioned so that it was comfortable and so that with eyes open and relaxed, the percipient looked straight at the inner surface of the ping-pong balls.

The red light was positioned between one and two feet away from the subject's face according to his or her preference. The headphones were fitted on the subject's head, and the experimenter switched on the white noise tape. While the experimenter had been with the agent in the office, the percipient had been asked to adjust the volume level and frequency content of the noise so that the noise was as loud as possible without being at all uncomfortable, and pleasant to listen to; most subjects preferred to cut out the higher frequencies, which sound rather harsh to many people.

Having switched on the tape, the experimenter immediately retired to her cubicle, started the tape which recorded the percipient's verbal mentation report, donned the headphones so that she could hear the report, and transcribed the subject's mentation as he or she reported it; the percipient remained in the ganzfeld for thirty minutes, and had been asked to report aloud all of his or her thoughts, imagery, feelings and sensations. The end of the ganzfeld period was signalled to the subject by the fading out of the white noise on the tape, followed by J.S. Bach's 'Air on a G string'. When the music had finished, the percipient extracted him or herself from the ganzfeld, and was again offered refreshments. If the experimenter had been unable to make a complete concurrent transcript, she now played back those parts of the tape which had not been transcribed, and added these to the transcript; the percipient was asked to clarify any words which had been unclear. Several examples of mentation transcripts are contained in Appendix 3.

The experimenter now gave the percipient the transcript, and asked him or her to indicate the divisions between images which occurred separately, in the sense that they were separated by a period of time during which no ideation occurred, or by a change in content. The percipient was also asked to indicate which images were surprising, novel and unrelated to the previous image. The percipients were also encouraged to point out which images were noteworthy for some other reason, but none did.

The experimenter then went to her office, and picked up the judging set of pictures specified by the slip of paper left on the desk by the agent. Returning to the laboratory, she showed the percipient the four pictures which made up the set, and asked him or her to complete a short questionnaire concerning the pictures. The percipient was asked to rate his or her liking for, interest in, familiarity with, and feeling of personal

significance towards each picture, and to place the four in rank order on the basis of which the percipient would prefer to look at for ten minutes. In case the percipient suspected that the measures might be expected to affect the judging process, the experimenter told him or her that the data were being collected as part of an independent study of the characteristics of the target pool.

The percipient then went through the mentation transcript, item by item, rating each picture for its correspondence to each image on a scale of 0 to 5, and recording the ratings on a form. The percipient had been instructed to be alert for correspondences which might be literal, formal, symbolic, emotional, or associative. When the judging of the whole transcript was completed, the total number of correspondence rating points assigned to each picture was summed, and the sums used as rough, but not binding guides to rank the pictures in order of their correspondence to the mentation (the picture corresponding best to the mentation being ranked first, down to the worst being ranked fourth), and to give each picture a rating on a scale of 0 to 5 for its overall correspondence. Subjects were allowed to tie ratings, but not rankings (this rating procedure has been used successfully in a number of experiments by Sargent, for example, Sargent, Milton, Payne and Bennet (1982)).

The experimenter now went downstairs to the agent's room, retrieved the experimental materials, and returned to the laboratory, where she gave the sealed target envelope to the percipient, who opened it to see which picture had been the target. The experimenter then answered any questions the percipient might have concerning the trial, and the session ended.

At the end of the experiment, the transcript for each trial was sent to the two independent judges, as well as the target set used on the trial

by the percipients, and a control set never seen by the percipient, which was randomly selected for each trial by a person independent of the experiment, after the experiment was over, by means of a pre-specified procedure using random number tables. The judges were asked to rate each mentation item on a 0-10 scale for its correspondence to each picture in the two sets provided for that trial, judging one set at a time (the order of the two sets had been pseudo-randomly counterbalanced), and to use the point sums for each picture as a guide in assigning to each picture a 0-10 rating of overall correspondence, also placing the pictures in rank order of correspondence to the mentation report. The instructions for the independent judges are contained in Appendix 5.

3.3. Results

All of the analyses were planned before the experiment began, except where otherwise stated. Data from one trial in condition (2) was not included in the analysis, since the agent had not followed the instructions to leave the building before the trial began, but instead remained during the trial; the agent made a note on his questionnaire that he had been confused about the instructions, but since the experimenter did not examine the questionnaires until the experiment was over, by which time the percipient had left the country, it was not possible to conduct a re-trial.

3.3.1. Comparison of scoring between conditions (1) and (2)

The tables below show the distribution of ranks assigned to the target in each of the three conditions, for each independent judge:

Target rank distribution for Judge 1

	RANK				SUM OF RANKS	MCE
	1	2	3	4		
CONDITION (1)	5	2	2	3	27	30
CONDITION (2)	2	2	6	1	28	27.5
CONDITION (3)	6	2	1	3	25	30
TOTAL	13	6	9	7	80	87.5

Target rank distribution for Judge 2

	RANK				SUM OF RANKS	MCE
	1	2	3	4		
CONDITION (1)	5	3	2	2	25	30
CONDITION (2)	4	3	3	1	23	27.5
CONDITION (3)	5	2	3	2	26	30
TOTAL	14	8	8	5	74	87.5

By chance, the target ranks would be approximately equally distributed across all four possible ranks. A mean rank of 2.5 would be expected by chance per trial, and a mean rank lower than this is in the direction of above-chance scoring. Contrary to prediction, scoring in condition (1) was not significantly higher than scoring in condition (2), according to the sum-of-ranks test of Solfvin et al (1978), although the very slight difference between the scores was in the predicted direction for both judges. For Judge 1, the mean target rank on each trial was 2.25 in condition (1), and 2.55 in condition (2), and for Judge 2, 2.08 in condition (1) and 2.09 in condition (2).

According to a post-hoc analysis comparing overall scoring to chance, using the sum-of-ranks analysis of Solfvin et al, scoring was significantly above chance for Judge 2 ($z=1.97$, $p(\text{one-tailed})<0.025$) and non-significantly above chance for Judge 1 ($z=1.06$, $p(\text{one-tailed})>0.10$)

3.3.2. Occurrence of displacement in the three conditions

It was predicted that displacement might occur in condition (3), but not in conditions (1) and (2). As a test for displacement within each condition, the average overall correspondence ratings assigned by each independent judge to the control pictures in the target set were compared to the average ratings assigned to the four pictures in the control set never seen by the percipients, following the analysis of Child and Levi (1980); if displacement had occurred to the control pictures in the target set, their average correspondence rating should have been higher than that of the pictures in the control set. Given that there was a tendency towards above-chance scoring overall , this displacement test was probably slightly conservative because the three control pictures in the target set would have been chosen to be as unlike as possible to the target, and so by chance, the three target set control pictures would correspond slightly less well, on average, to the mentation than the pictures in the control set.

The tables below show the average overall correspondence rating assigned to the control pictures in the target set and the pictures in the control set, separately for each judge.

Average overall correspondence rating per picture for Judge 1

	TARGET SET CONTROL PICTURES	CONTROL SET PICTURES
CONDITION (1)	3.1	3.4
CONDITION (2)	4.0	4.0
CONDITION (3)	3.8	4.0

Average overall correspondence rating per picture for Judge 2

	TARGET SET CONTROL PICTURES	CONTROL SET PICTURES
CONDITION (1)	1.9	1.9
CONDITION (2)	2.2	2.4
CONDITION (3)	2.4	2.1

For both judges in all three conditions, the mean ratings assigned to target set control pictures and to control set pictures were very close; only for Judge 2 in condition (3) were control set picture ratings lower than target set control picture ratings, as would be expected if displacement had occurred, but not significantly so as tested using the related t-test to compare the two average ratings on each trial (t=0.537, 11df, p(one-tailed)>0.10).

In case the assignment of an overall correspondence rating to each picture after completing the item-by-item judging had introduced the possibility that the judges might be inclined to assign low overall ratings to pictures which had not been ranked first (to make an apparent 'hit' more spectacular, for example), hence tending to lower the average target set control picture rating and therefore disguise any displacement, a post-hoc analysis using instead the sum of item-by-item correspondence rating points for each picture was performed. The results are shown in the table below:

Average correspondence rating point sum per picture for Judge 1

	TARGET SET CONTROL PICTURES	CONTROL SET PICTURES
CONDITION (1)	12.9	14.3
CONDITION (2)	16.0	18.4
CONDITION (3)	16.2	15.4

Average correspondence rating point sum per picture for Judge 2

	TARGET SET CONTROL PICTURES	CONTROL SET PICTURES
CONDITION (1)	13.8	15.5
CONDITION (2)	21.9	19.0
CONDITION (3)	20.5	16.3

Using these data, point sums were higher for target set control pictures

than for control set pictures in condition (3) for both judges (t=0.222 for Judge 1, t=1.175 for Judge 2; 11df and p(one-tailed)>0.10 in both cases), and in condition (2) for Judge 2 (t=0.548, 10df, p(one-tailed)>0.10).

Rogo (1979) noted that at the beginning of the ganzfeld session, the percipient seemed to describe the target picture, and then went on to displace to the control pictures in the target set. Stanford and Neylon (1975) suggested that displacement might occur if the percipient felt that the session was going on too long and began to look ahead to the judging period, when he or she would see all of the target set; this situation might also result in psi-hitting at the beginning of the session, turning into displacement towards the end. After the experiment, it was decided to see if a change from psi-hitting to lower scoring on the target (as would result if, among other things, displacement occurred) was evident during the course of the session, by comparing the percentage of correspondence rating points allocated to the target in the first and second halves of each session, using the Wilcoxon Test. The sessions were divided into halves containing equal numbers of mentation items; if there was an odd number of items, the item which divided the two halves was omitted for the purpose of analysis. The results are summarised in the table below:

Percentage of correspondence points allocated to the target in the first and second halves of each trial

	JUDGE 1		JUDGE 2	
	FIRST HALF	SECOND HALF	FIRST HALF	SECOND HALF
CONDITION (1)	27.2	30.9	28.4	32.2
CONDITION (2)	32.0	24.4	27.7	30.2
CONDITION (3)	29.4	26.4	26.1	26.2

Only in conditions (2) and (3) for Judge 1 was scoring higher in the first than in the second half of the trial, with neither difference being significant.

The largest difference was in condition (2) (N=11, T=17, 0.10>p(one-tailed)>0.05), but the direction of this difference was reversed for Judge 2. The difference in condition (3) did not approach significance (N=12, T=33, p(one-tailed)>0.10).

3.3.3. Agent questionnaire measures

Spearman correlation coefficients were calculated for the relationship between scores on the four agent questionnaire measures and the rank assigned to the target by each independent judge. The two conditions for which an agent had been present, conditions (1) and (3), were analysed separately because, if displacement had occurred in condition (3), combination of the two conditions could have obscured any effect on the target in condition (1).

The results are summarised in the table below; two agents in each condition failed to complete a questionnaire, and so N=10 in both conditions.

Correlations between agent questionnaire measures and target ranks in condition (1)

	JUDGE 1		JUDGE 2	
	RHO	P(2-T)	RHO	P(2-T)
BAD MOOD	0.25	>0.10	0.05	>0.10
HIGH MOTIVATION	-0.07	>0.10	0.04	>0.10
BOREDOM	-0.34	>0.10	-0.33	>0.10
CONCENTRATION	0.42	>0.10	0.62	0.10>P>0.05

Correlations between agent questionnaire measures and target ranks in condition (3)

	JUDGE 1		JUDGE 2	
	RHO	P(2-T)	RHO	P(2-T)
BAD MOOD	0.01	>0.10	0.08	>0.10
HIGH MOTIVATION	-0.28	>0.10	0.36	>0.10
BOREDOM	-0.08	>0.10	-0.15	>0.10
CONCENTRATION	-0.18	>0.10	-0.26	>0.10

Only the negative correlation between concentration and target rank approached significance, for Judge 2 in condition (1), indicating a tendency for high scoring on the target to be associated with a high degree of concentration.

To allow for the possibility that scoring might manifest itself as displaced scoring, it was also planned to calculate Pearson correlations of the agent questionnaire measures with the correspondence rating of the highest-ranked picture on each trial for both judges. The results are shown below:

Correlations between agent questionnaire measures and highest correspondence rating for condition (1)

	JUDGE 1		JUDGE 2	
	RHO	P(2-T)	RHO	P(2-T)
BAD MOOD	0.14	>0.10	0.11	>0.10
HIGH MOTIVATION	0.42	>0.10	0.12	>0.10
BOREDOM	0.29	>0.10	0.22	>0.10
CONCENTRATION	-0.35	>0.10	-0.47	>0.10

Correlations between agent questionnaire measures and highest correspondence ratings for condition (3)

	JUDGE 1		JUDGE 2	
	RHO	P(2-T)	RHO	P(2-T)
BAD MOOD	0.29	>0.10	0.59	<0.05
HIGH MOTIVATION	0.61	<0.05	0.43	>0.10
BOREDOM	-0.27	>0.10	-0.37	>0.10
CONCENTRATION	-0.02	>0.10	-0.36	>0.10

Two results were significant at the 0.05 level, and both in condition (3). High motivation correlated significantly positively with the highest rating for Judge 1, and bad mood correlated significantly positively with the highest rating for Judge 2.

The characteristics of the data are summarised in the following table:

Descriptive statistics for condition (1)

	N	MEAN	S.D.
BAD MOOD	10	28.90	21.93
HIGH MOTIVATION	10	69.10	7.00
BOREDOM	10	39.40	16.83
CONCENTRATION	10	52.10	16.31
JUDGE 1 TARGET RANKS	10	1.90	1.10
JUDGE 2 TARGET RANKS	10	2.00	1.05
JUDGE 1 HIGHEST RATING	10	5.30	1.77
JUDGE 2 HIGHEST RATING	10	3.50	1.58

Descriptive statistics for condition (3)

	N	MEAN	S.D.
BAD MOOD.	10	43.60	25.55
HIGH MOTIVATION	10	71.10	15.02
BOREDOM	10	40.40	19.34
CONCENTRATION	10	56.20	26.98
JUDGE 1 TARGET RANKS	10	1.80	1.23
JUDGE 2 TARGET RANKS	10	1.80	0.92
JUDGE 1 HIGHEST RATING	10	6.00	1.63
JUDGE 2 HIGHEST RATING	10	3.80	1.40

3.3.4. Picture preference measures

Pearson correlations of the first four measures of the percipient's attitude towards the pictures with each judge's overall rating of correspondence to each picture were obtained for each independent judge, in order to test whether the percipient's attitude towards a picture might determine to which, if any, of the pictures he or she would displace. The results are summarised in the table below; only 11 trials were available in condition (3), since the experimenter mistakenly omitted to ask the percipient to complete the questionnaire on this trial.

Correlations of picture preference measures with overall correspondence ratings for each picture for Judge 1

	CONDITION (1)		CONDITION (2)		CONDITION (3)	
	R	P(2-T)	R	P(2-T)	R	P(2-T)
LIKED	-0.07	>0.10	0.19	>0.10	0.01	>0.10
BORING	-0.04	>0.10	-0.27	>0.10	-0.04	>0.10
FAMILIAR	0.05	>0.10	0.08	>0.10	0.12	>0.10
SIGNIFICANT	-0.09	>0.10	0.12	>0.10	-0.04	>0.10

Correlations of picture preference measures with overall correspondence ratings for each picture for Judge 2

	CONDITION (1)		CONDITION (2)		CONDITION (3)	
	R	P(2-T)	R	P(2-T)	R	P(2-T)
LIKED	0.04	>0.10	0.16	>0.10	-0.07	>0.10
BORING	-0.02	>0.10	-0.26	>0.10	-0.10	>0.10
FAMILIAR	0.08	>0.10	0.13	>0.10	0.22	>0.10
SIGNIFICANT	-0.14	>0.10	0.13	>0.10	0.13	>0.10

The characteristics of the data are summarised in the following table:

Descriptive statistics

	CONDITION (1)			CONDITION (2)			CONDITION (3)		
	N	MEAN	S.D.	N	MEAN	S.D.	N	MEAN	S.D.
LIKED	48	3.5	1.1	44	3.3	1.3	44	3.1	1.1
BORING	48	2.3	0.8	44	2.4	0.8	44	2.3	0.8
FAMILIAR	48	1.3	0.6	44	1.2	0.5	44	1.1	0.4
SIGNIFICANT	48	1.6	1.0	44	1.9	1.0	44	1.8	1.0
OVERALL RATING, JUDGE 1	48	3.2	2.0	44	4.1	2.1	44	3.7	2.1
OVERALL RATING, JUDGE 2	48	2.0	1.7	44	2.3	1.9	44	2.1	1.7

None of the four measures correlated significantly with correspondence ratings; however, as can be seen in the table above, the standard deviations of all of the attitude measures were quite low, particularly the measures of how boring and how familiar the pictures were to the percipients.

It had been planned to correlate the rank assigned to each picture on the basis of which the percipients would prefer to look at for ten minutes with the correspondence rating assigned to the picture by the

judges, but it was realised at the end of the experiment that such an analysis would be invalid because the assignment of ranks to the pictures within each trial would mean that pictures would not be comparable between trials on such a measure, as would be necessary for such a correlation. Therefore, it was decided to instead calculate a value of Kendall's Tau for each trial for the relationship between the percipients' liking ranks and the judges' correspondence ranks assigned to each picture in the set, and to compare the number of positive and negative tau values using the binomial test. Kendall's Tau is a measure of the extent to which two sets of ranks tend to be aligned or misaligned, yielding a positive value if the ranks align, a negative value if they misalign, and a value of zero if they bear no systematic relationship to each other. By chance, the number of positive and negative tau values should be equal. The analysis yielded 16 positive, and 11 negative tau values for the relationship between the percipients' liking ranks and the mean of the two independent judges' correspondence ranks, showing a slight but by no means significant tendency for liking to be related positively to correspondence ($p(\text{two-tailed})=0.4$).

One of the reasons for using the independent judges' data rather than that of the percipients for the analyses reported, was the suspicion that the percipients might allow themselves to be swayed in their judgement of correspondence by their liking for the pictures. A post-hoc analysis was carried out to see if this had, in fact, been the case. Calculating tau values for the relationship between the percipients' liking and correspondence ranks, 23 positive values were obtained, a number significantly greater than the 4 negative tau values obtained ($p(1\text{-tailed})<0.0002$), indicating a tendency for liking and correspondence ranks to be similar.

Following the suggestion of Sondow, Braud and Barker (1982) that percipients' liking ranks might be a better measure of psi than their correspondence ranks, the two were compared using the sum-of-ranks analysis of Solfvin et al (1978), for those 34 trials on which picture preference questionnaires had been completed. The distributions of the two sets of target ranks are shown in the table below:

Target liking and correspondence rank distributions for percipients

	RANK				SUM OF RANKS	MCE
	1	2	3	4		
CORRESPONDENCE	6	10	10	8	88	85
LIKING	7	8	11	8	88	85

However, both rank sums were identical, with a mean rank per trial of 2.59, which is slightly below chance expectation.

3.3.5. Mentation categories

The proportion of all item-by-item correspondence rating points allocated to the target on the basis of each mentation category (MCE=25%) was compared to the proportion allocated to the target on the basis of the remaining mentation for each trial, using the Wilcoxon Test. The results for Judge 1 are summarised in the table below (the data of Judge 2 were not usable since he had not clearly identified the mentation items for which the points were assigned).

Percentage of points allocated to target for Judge 1

Novel mentation:	19.6%	Remainder:	28.5%
Surprising mentation:	35.2%	Remainder:	26.3%
Unrelated mentation:	26.7%	Remainder:	27.2%

According to prediction, percipients scored significantly better on surprising mentation than on the remainder ($N=21$, $T=57$, $p(\text{one-tailed}) < 0.025$).

However, contrary to prediction, percipients scored worse on novel than on memory-related imagery, the direction of the difference being due to below-chance scoring on novel imagery (5.4% below chance) and above-chance scoring on memory-based imagery (3.5% above chance). Also contrary to prediction, scoring was slightly worse on unrelated than related mentation items, although scoring on both mentation types was above chance.

(Note: The use of the Wilcoxon Test replaces a planned analysis in which the proportion of item-by-item correspondence rating points assigned to the target on the basis of a category of mentation by all subjects was to be compared to the proportion of points allocated to the target on the basis of the rest, using the binomial test. The author is grateful to Drs. Ephraim Schecter and Donald McCarthy for pointing out that, since the item-by-item correspondence points are probably not assigned independently of each other, the use of the binomial test would be unjustified. Thanks are also due to Drs. Jessica Utts, Ephraim Schecter, Donald McCarthy and George Hansen for suggesting the use of the Wilcoxon Test instead).

3.4. Discussion

Although overall scoring tended to be above chance (significantly so by a post-hoc analysis of the data of Judge 2, $p(\text{one-tailed}) < 0.025$, although the significance of this result could have been due to overanalysis), scoring with an agent was only slightly higher than without an agent, thus giving no real support to the hypothesis that the presence of an agent should yield higher scores. No significant evidence of displacement was found in any of the three conditions, although in the planned displacement analysis, only the results in condition (3), for Judge 2,

were in a direction consistent with the occurrence of displacement. In a post-hoc analysis which was hoped would be more sensitive to the occurrence of displacement, both judges' data yielded results in a direction consistent with the occurrence of displacement in condition (3), although this was also the case for condition (2) for Judge 2. Again, however, none of the results approached significance. A post-hoc analysis which compared scoring in the first and second halves of each trial, following suggestions that psi-hitting might turn into displacement later in the trial if it occurred, found non-significant declines in scoring on the target in conditions (2) and (3) for Judge 1. Although agent questionnaire measures failed uniformly to yield significant correlations with the ranks assigned to the target by each judge, two correlations between the highest correspondence rating assigned on each trial and the agent questionnaire measures were significant in condition (3); motivation correlated positively with scoring for Judge 1 ($r=0.61$, $N=10$, $p(\text{two-tailed})<0.05$), while bad mood correlated positively with scoring for Judge 2 ($r=0.59$, $N=10$, $p(\text{two-tailed})<0.05$). Since correlations with the highest rating on each trial had been examined to allow for the possibility of displaced scoring, the occurrence of significant correlations with the highest rating but not with the target rank on each trial, and only in condition (3), might be taken to add to the weak tendency for results directionally consistent with the occurrence of displacement to appear in condition (3), where displacement had been predicted; however, such a tendency is very far from being conclusive, and at best suggests replication with a larger number of trials in each condition.

The significant correlations with mood and motivation, if not simply the product of multiple analysis, are difficult to interpret. If they really were correlations with displaced scoring, as suggested by their occurrence with

the highest rating, but not the target rank on each trial, then their most useful function might be to indicate whether correlations with displaced scoring follow the same pattern as above-chance scoring on the intended target, or the reverse. However, the directions of the two correlations appear to conflict, with the psychologically 'negative' quality of bad mood and 'positive' quality of high motivation both correlating positively with the highest rating. Although it could be argued that a high level of motivation might be associated with affectively negative qualities, such as anxiety, the lack of direct measures of any such qualities in the study restrict this hypothesis to the role of speculation.

None of the measures of the degree to which each picture was liked by the percipient, or seemed boring, familiar, or personally significant, correlated significantly with its resemblance to the mentation, apparently indicating that the percipient's attitude to each picture in the set did not determine to which picture he or she might have displaced, although in the absence of any evidence for any displacement in the study, this hypothesis may not have received a fair test. In addition, the variance of the scores on all four of the attitude measures were quite low, and a future examination of this question should perhaps involve deliberate manipulation of the characteristics of the pictures in the target set, so that the range of attitude scores would be large enough to reveal any effect.

Although there was a very slight tendency for the percipients' liking ranks to be similar to the judges' ranking of correspondence on each trial, such a result would be consistent with a tendency for the judges to share with the percipients the same preferences for the pictures, and for them to be slightly swayed by their preference in their judging of correspondence, rather than indicating a tendency for the percipients' preference for pictures determining to which picture they displaced.

A more interesting result, perhaps with practical implications, was the highly significant post-hoc finding that the percipients' liking ranks were very similar to their correspondence rankings ($p(\text{one-tailed}) < 0.0002$), but not to the correspondence rankings of the two independent judges ($p(\text{two-tailed}) = 0.4$), seeming to indicate that the percipients had allowed themselves to be swayed in their judging of correspondence by their liking for the individual pictures. While it is a moot point as to whether the correspondence judgements of the percipients of of the independent judges most truly reflect the correspondence between mentations and pictures, the higher level of overall scoring obtained by both judges compared to that obtained by the percipients could be interpreted as support for the judges' ability to remain unaffected by picture qualities (although it could be argued that the percipients really did evidence slightly below-chance scoring, while their transcripts misleadingly tended to related to the targets).

Further investigation of whether independent judges are more successful than percipients in judging correspondence, and the extent to which any differences rely upon the previous judging experience of either party, would therefore seem to be worthwhile. A more revealing way of examining the question of which group make the better judges would be to compare the number of significant relationships between psychological variables measured in an experiment and the two groups' scores, since although it is impossible to tell what the overall score ought to be in any particular case, it seems reasonable to assume that, whatever the score on any trial, it should relate to the psychological state of the participants. Thus, whichever group is responsible for the largest number of correlations would be likely to be the better judges.

A post-hoc analysis to investigate a suggestion by Sondow, Braud and Barker (1982) that percipients' liking ranks may be a better measure of

psi than their judgements of correspondence, found no difference between the sum-of-ranks assigned to percipients to the targets on the basis of liking and of correspondence, although again, this result is difficult to interpret in the absence of a 'true' measure of correspondence.

Finally, the examination of scoring on the basis of various mentation categories yielded a significant predicted effect, namely, that of higher scoring on surprising than unsurprising mentation ($p(\text{one-tailed}) < 0.025$). Contrary to prediction, scoring tended to be worse on novel than on memory-related imagery, although the direction of this difference was due to a below-chance deviation on novel imagery which was larger in magnitude than the slightly above-chance deviation on memory-related imagery. Also contrary to prediction, scoring was slightly worse on unrelated than related imagery, with both scores being slightly above chance.

In retrospect, several aspects of the experimental procedure were problematic. Firstly, the approach to displacement as possibly resulting from the availability of the control pictures in the target set to the agent's awareness did not take into account the further possibility that displacement might also involve precognition by the percipient of the judging session, when he or she would see all four pictures in the target set, as suggested by Stanford and Neylon (1975). This possibility could have been ruled out by showing the percipient only the target at the end of the ganzfeld, rather than having him or her judge the entire target set.

Secondly, a practical problem was that the instructions which the agents had to follow were rather complex, although necessarily so in the absence of personnel available to act as agent-experimenter. Many agents seemed to feel nervous about making a mistake in the procedure, and one agent did in fact misunderstand the instructions so badly that the data from

one trial had to be abandoned. A more straightforward design from the agent's point of view, or the employment of an agent-experimenter would have been preferable. An improvement in design also related to the agents' part in the procedure would have been to have had different agent-percipient pairs for each trial, rather than a repeated-measures design; this would have avoided the necessity for the percipient and agent not to be given full feedback at the end of each trial, and would have eliminated the risk of accidental communication between the two involved in the double-blind procedure. Such a design would have had the further advantage that neither agent nor percipient would have been aware that their trial was any different from any of the others, thereby avoiding any possible psychological effects of such awareness.

Thirdly, an increase in the number of trials involved in each condition would seem preferable, to allow weak effects to be discernable. Finally, the use of experienced judges as percipients would help to overcome some of the problems of interpretation raised by the use of independent judges, since experienced judges would combine a high level of judging ability with the percipient's full knowledge of his or her own mentation.

CHAPTER 4

EXPERIMENT TWO: THE EFFECTS OF TWO AGENT 'STRATEGIES' ON THE PERCIPIENT'S EXPERIENCE OF THE GANZFELD

4.1. Introduction

In this second exploratory study, the role of the agent was further investigated, this time with the emphasis on the investigation of the psychological effects upon the percipient of the agent's activity, rather than on differences in scoring, although these were also of interest. Also following on from the first study was an interest in how the agent's psychological state related to performance; whether particular mentation categories were especially useful in identifying the target; and whether percipients' attitudes towards the pictures in the set affected their correspondence judgements. These questions, and others initiated in this study, are dealt with in more detail below.

Two main aspects of the agent's activity were examined; firstly, the degree to which the "structuredness" of the agent's task might affect the "structuredness" of the percipient's mentation, and secondly, whether the use by the agent of target-related imagery in different modalities would result in the experience of imagery similarly varied in modality by the percipient.

Only two studies to date have examined the effect of the presence or absence of the agent upon the percipient's quality of experience during the ESP trial. Harley and Good (1981) compared GESP and clairvoyance in a ganzfeld study, and found that mentation was less structured and rational, and visual imagery less effortful in the clairvoyance than in the GESP condition ($p<0.05$ in each case). Although planned comparisons of 24 psychological variables yielded no significant differences between the GESP

and clairvoyance conditions of a similar ganzfeld study by Sargent, Milton, Payne and Bennet (1982), post hoc findings that percipients marked a greater percentage of mentation items as "bizarre" in the clairvoyance condition than in the GESP condition (12% as compared with 4%, N=10, $p<0.02$), and that a significant increase in relaxation (pre- to post-test) ($p<0.02$) during the session occurred in the clairvoyance, but not the GESP condition, would seem to be consistent with the conclusion of Harley and Good that the agent may impose a rational structure on the percipient's thoughts which would otherwise be lacking in the ganzfeld.

It seems further possible that an agent might be able to affect the "structuredness" or rationality of the percipient's mentation by virtue of the structuredness of his or her own thinking during the session, and that it might be this variable, rather than the agent's presence or absence as such, which determines the effect upon the percipient. Thus in the studies of Harley and Good and of Sargent et al, the percipient's mentation in the GESP condition might have been less structured than in the clairvoyance condition if the agent's own mental activity had been unstructured.

The second aspect of the agent's activity which was of interest in the present study, that of the modalities of imagery used in thinking about the target, has similarly received little experimental attention so far, although agents have been exposed to multi-modal target environments in the dream ESP studies of Krippner, Ullman and Honorton (1971) and of Krippner et al (1971), and to various physical stimuli in studies by, for example, Rice (1966), who fired blank cartridges behind the agent, or asked the agent to place one foot briefly in ice water, and by Tart (1963) who, himself acting as agent, self-administered electric shocks by means of electrodes strapped to his legs. Although Krippner, Ullman and Honorton compared to chance how well the percipient's mentation matched the

various modal aspects of the target, no attempt, to the best of the present author's knowledge, has been made to examine whether percipients would experience imagery in the same modality as the sensory or imagery experience of the agent, with the exception of a ganzfeld study by Sondow, Braud and Barker (1982) in which percipients felt more emotion when agents felt more emotion ($r=0.27$, $t=1.76$, $p(\text{one-tailed})<.04$), although no details were given of any interactions between percipients and agents before the trial which could have led to such an effect by non-paranormal means.

In this study, then, it was required to contrast a condition in which the agent's activity was structured and rational with a condition in which it was less so, and to contrast a condition in which the agent experienced target-related imagery in a variety of modalities on each trial with a condition in which he or she did not. In order to keep the number of experimental trials to a minimum, it was decided to combine the structured and multimodal agent activities in one condition, and to contrast this condition with one which would involve relatively less structured thinking, and no multi-modal imagery, but which would nevertheless be expected to be successful. It was felt that an activity suitable for this condition would be to have the agent pay little attention to the target, but simply hope for the percipient to succeed. These two conditions were labelled the "Experiencing" and the "Hoping" conditions respectively, and each strategy was used in one half of each trial.

In the "Experiencing" strategy, the agent was instructed to attempt to experience the scene depicted in the target picture as realistically, and in as many ways in addition to the purely visual as possible, with the imaginative use of, if appropriate, the senses of smell, touch, taste, hearing, the experience of atmosphere and emotion, the imitation of posture and

movement, and anything else the agent wished. In the "Hoping" strategy, the agent was instructed to pay little attention to the target picture (although its contents were known to the agent) and to hope for the percipient's success. It was predicted that the percipients' thinking would be more unstructured and dreamlike during the "Hoping" condition than during the "Experiencing" condition which presented a more structured and concrete task to the agent. Further, it was predicted that the percipients' mentation in the "Experiencing" condition would be more varied in modality than in the "Hoping" condition, and that the particular ways in which the agent experienced the target would be experienced by the percipient.

It was also planned to test for differences in scoring between the two conditions, although no prediction was made as to which might be superior. However, it was predicted that overall scoring would be significantly positive.

Following the previous experiment, correlations between a number of variables relating to the agent's psychological state were examined with respect to performance, including some measures which were felt might reflect some variables which the measure of 'motivation', which correlated significantly positively with ESP scoring in the previous study, might have confounded. These items measured 'conscious effort' versus 'mere intention', and 'detached, gamelike attitude' versus 'anxiety to succeed', and it was predicted that low scores on 'conscious effort' and on 'anxiety to succeed' should be associated with success, on the basis that a lack of anxiety and striving, being associated with a less stressful approach to motivation, should also be associated with successful scoring. The degree of the agent's enjoyment of the strategy was also predicted to correlate positively with ESP scoring, on the basis of a similar rationale, and the degree to which the agent felt that ESP was possible was predicted to

correlate positively with success, in accordance with the large body of data relating percipients' scores on this variable to scoring (Palmer, 1978). A number of other measures of the agent's state were also correlated with scoring, but no predictions were made concerning the directions of the outcomes. A final analysis concerning the agent's activity was to examine whether the percipients, although blind via normal sensorimotor channels as to which condition was in operation at any time, could identify when they were in each condition; Sargent, Milton, Payne and Bennet (1982) examined the percipient's ability to discriminate correctly between a GESP and a clairvoyance trial, and found a tendency (not tested statistically) for percipients relatively experienced in the ganzfeld to make a correct forced choice in naming which of two trials had been a GESP trial, and which a clairvoyance trial, although the basis of this discrimination, if not merely a spurious result, was not determined.

The correlations between scoring and a number of psychological measures relating to the percipient were also examined, and, in accordance with previous findings in the ganzfeld (see Stanford's (1984) recent review of the extensive work in this area), it was predicted that pre-session relaxation, good mood, and expectation of success would all correlate positively with ESP scoring, as would post-session measures of relaxation, good mood, amount of dreamlike thought during the trial, lack of effort in experiencing imagery, and the degree to which the percipient's attitude was "detached and gamelike" as opposed to one of anxiety to succeed.

As discussed in the introductory chapter, another area of interest in this study was the possibility of using information theoretic concepts to predict which trials might be successful; using this approach, therefore, it was predicted that trials in which one picture stood out above the rest of the target set in terms of correspondence to the mentation would be more

likely to be successful than those trials on which there was no such apparent strong individual correspondence.

A related investigatory analysis examined whether the two independent judges who judged the correspondence between each mentation report and the pictures in the judging set could tell, without knowing the identity of the target, which trials had been successful and which had not, using their own criteria to make this judgement; since the independent judges in this experiment were again experienced both as ganzfeld subjects and as independent judges of ganzfeld data, it was felt that they might have developed hypotheses concerning which aspects of a session might relate to success, and that, if supported by the data, such hypotheses might have predictive, and hence, practical value for future research.

Continuing the investigation of performance on the basis of various imagery categories, scoring based on vivid, fleeting, bizarre, memory-based, non-visual, 'unrecognisable' (i.e., not recognisable as an identifiable object), and highly-coloured mentations was compared to scoring on the remaining mentation. In the previous experiment, scoring on the basis of mentation which was memory-based, surprising, and unrelated had been examined; percipients scored significantly better on surprising imagery than on the remainder. Following Sargent, Bartlett and Moss (1982), Sargent, Moss and Bartlett (1982), and Sargent, Milton, Payne and Bennet (1982), it was predicted that scoring on the basis of bizarre mentation would be higher than on the remainder. On the basis of anecdotal comments from some of the 'gifted' subjects surveyed by White (1964), it was predicted that scoring on the basis of fleeting mentation would be higher than on the remaining mentation, and on the basis of similarly anecdotal suggestions from modern-day apparently successful percipients (Schlitz, 1984), it was

predicted that scoring on the basis of non-visual mentation would be higher than scoring on visual mentation (a fuller discussion of this material may be found in the introductory chapter).

A final analysis investigated the prediction based on the highly significant ($p<0.0002$) finding from the previous experiment, that the percipients' liking for the pictures in the target set would be aligned with his or her correspondence ranks, indicating the percipients' tendency to be swayed in their correspondence judgements by their liking for the pictures; again, most of the percipients in the study had no prior experience of the ganzfeld. Because of the percipients' bias in the previous study, only the correspondence judging data of the two independent judges were used in the analyses, as before.

4.1.1. Planned Analyses

To summarise, the planned analyses for this experiment were as follows:

Overall Scoring

(i) It was predicted that the average sum of ranks assigned by the two independent judges to the target on each trial would be significantly below chance (representing above-chance scoring), as tested by the sum-of-ranks analysis of Solfvin et al (1978) (one-tailed).

Comparison of "Experiencing" and "Hoping" conditions

(i) It was predicted that percipients would report more unstructured, dreamlike thought during the "Hoping" than during the "Experiencing" condition, as tested by applying the binomial test (one-tailed) to percipients' responses to question 10 (i) on the post-session

questionnaire.

(ii) It was predicted that the percipients' imagery would be more varied in modality during the "Experiencing" condition than during the "Hoping" condition, as tested by comparing the total number of modalities in which the percipients stated they had experienced mentation (in response to question 10 (a) to (h) of the post-session questionnaire), using the binomial test (one-tailed).

(iii) It was predicted that the particular imagery modalities used by the agent would be those experienced by the percipient during the trial, as tested by applying the chi-squared test (one-tailed) to compare the number of times both percipient and agent reported the use or experience of each modality with the number expected by chance (using the percipient's responses to question 10 (a) to (h) on the post-session questionnaire, and the agent's responses to question 10 on the agent questionnaire from the "Experiencing" condition.

(iv) The binomial test was applied to the responses to post-session questionnaire question 11 (one-tailed) to see whether the percipients correctly guessed which condition was in operation in each half of the trial more often than would be expected by chance.

(v) In order to test whether there was any difference in scoring between the "Experiencing" and "Hoping" halves of the trial, both a sign test and a t-test (both two-tailed) were used to compare the Z-score of the sum of the item-by-item rating points assigned to the target (defined as the sum of points assigned to the target, minus the average point sum assigned to the three control pictures, all divided by the standard deviation of the point sums of all four) in each half of the session, separately for each independent judge.

Agent questionnaire measures

(i) It was planned to examine Pearson correlations between all of the agent questionnaire measures with the Z-score of the overall rating assigned to the target picture, separately for each judge. For each of the questionnaires completed by the agent following the "Experiencing" and "Hoping" conditions, it was predicted that the correlations would be positive with responses to question 1 (enjoyment); negative with responses to question 6 (conscious effort); and positive with responses to questions 7 and 8 (gamelike attitude, and belief that success was possible, respectively).

Percipient questionnaire measures

(i) It was planned to examine Pearson correlations between all of the percipient questionnaire measures with the Z-score of the overall rating assigned to the target picture, separately for each judge. It was predicted that correlations would be positive with pre-session measures of relaxation (question 1), good mood (question 2), and expectation of success (question 3), and with post-session measures of relaxation (question 1), good mood (question 2), amount of dreamlike thought experienced (question 4), lack of effort for imagery (question 5), and gamelike attitude (question 6).

Identification of successful trials

(i) It was predicted that those trials on which one picture stood out above the rest in terms of correspondence to the mentation report would be more likely to be successful than those trials on which all the pictures in the set corresponded roughly equally well; thus it was predicted that the Spearman rank correlation between the Z-score of the rating of the highest-rated picture in the set and the rank assigned to the target would

be significantly negative (since a low correspondence rank indicates above-chance scoring), the analysis being conducted separately for each judge's data.

(ii) It was planned to compare the ranks assigned to the target on those trials which were designated by each independent judge as being likely to be successful, with the ranks assigned to the target on the remaining trials, using the unrelated t-test (one-tailed), to see if the judges could identify successful trials.

Mentation Categories

(i) It was planned to compare scoring on the basis of each of the mentation categories investigated with scoring on the basis of the remaining imagery; it was predicted that scoring on the basis of bizarre, fleeting, and non-visual imagery would be significantly higher than on the remainder. Full details of the planned analysis, and an analysis which was used instead when the former proved to be invalid, are given in the results section.

Picture preference measures

(i) It was predicted that percipients' correspondence judgement ranks would tend to be aligned with their picture preference ranks as tested by applying the binomial test (one-tailed) to the number of positive and negative values of Kendall's tau obtained on each trial for the relationship between the two rankings; under this hypothesis, more positive than negative tau values would be expected.

4.2. Method

4.2.1. Design

Each percipient completed one trial during which the agent used the two strategies, one in each half of the trial. The order in which the agents used the two strategies was pseudo-randomly counterbalanced. The target set, target and strategy order for each trial were prepared in advance by a person otherwise uninvolved with the experiment by a procedure pre-specified by the author. An entry point in the Rand Corporation (1951) random digit tables was chosen by tossing a coin several times and converting the information into an entry point by means of a numerical code. Another such code was used to convert the subsequent digits into the appropriate information, with the restriction that no subject who acted as both percipient and agent in the study ever used the same target set in both trials. Both percipient and experimenter (the author) were blind as to the identity of the target and strategy order until the trial was over.

4.2.2. Subjects

Twenty percipients with their agents took part in one trial each, with eleven percipients acting as agent for other subjects. 7 male and 13 female subjects acted as percipients, and 7 male and 13 female subjects acted as agents. Six out of the twenty percipients had had previous experience of the ganzfeld. All subjects were or had been university students, and were aged between 18 and 35. Some were acquaintances of the experimenter, others were volunteers from an undergraduate parapsychology class. All percipients were at least moderate "sheep" and were encouraged to bring along a similarly interested friend to act as their

agent. Those who did not so choose were allocated an agent by the experimenter, who tried to choose someone whom the percipient would be likely to get along with, and were introduced to their agent in an informal social setting several days before their trial. The experimenter met individually with all subjects prior to the experiment to explain the use of the ganzfeld and to describe the experimental design and procedure in general terms.

4.2.3. Targets and Target Selection

The same target pool was used as in the first experiment, with an identical target selection procedure.

4.2.4. Setting and Apparatus

The setting and apparatus were the same as in the first experiment, except that in the present study, a room across the corridor from the author's office was used as the agent's room, and the experimenter surveyed the corridor outside the laboratory (to which the agent would need access in order to cheat by rapping on the laboratory walls), by means of a TV monitor in her cubicle linked to an unavoidably obtrusive camera set up in the corridor. This was felt to be an improvement over the precautions against cheating taken in the first experiment, which relied upon the experimenter's vigilance against events which would be less obvious than the appearance of the agent on the TV screen.

4.2.5. Procedure

When the percipient and agent arrived at the laboratory for their trial, the experimenter provided coffee and biscuits and the group chatted until the two subjects were at ease and ready to begin. The two 'strategies'

which the agent would use were described to the two subjects, since it was felt important that the percipient should feel ready to report any imagery that occurred in modalities other than the visual. The subjects were told that one strategy would be used by the agent in one half of the trial, and the other strategy in the other half, but that neither experimenter nor percipient would know in which order the strategies had been used until the end of the trial. The experimenter then escorted the agent to her office where the target pool and target selection materials were kept, and gave the agent simple verbal instructions concerning these, also pointing out a written version of the instructions on the desk. She started two stopwatches, gave one to the agent, and returned to the laboratory.

In the office, the agent proceeded to open two sealed envelopes containing slips of paper bearing the target set number and target letter (identifying the target within the set) for that trial. The agent removed the specified envelope containing the target picture and locked the box containing the target pool. Leaving only the target set number behind, the agent went to the agent's room across the corridor.

On the desk in the agent's room was a sealed envelope containing instructions for what the agent should do and in what order the strategies should be used during the ganzfeld session, which began when the stopwatch read ten minutes. The agent's instructions, and attached questionnaires, are reproduced in Appendix 7. In one half of the trial, the instructions for the agent read as follows:

> Open the envelope containing the target picture, and place the target picture on the table in front of you. For the next 15 minutes, try to experience the content of the target picture as realistically and in as many ways as possible in addition to the purely visual. Try to imagine yourself in the environment which the picture shows; if there are people in the picture, imagine yourself as one of them, especially any central characters. Imagine hearing what they would hear,

> feeling what they would feel (temperature, texture and weight of clothes, etc.), smelling what they would smell, tasting any food around them. Get up and imitate their movements and postures. As well as imagining the physical sensations, try to envelop yourself in the atmosphere (if any) that the picture tries to create, and to feel the emotions it depicts.

In the other half of the trial, the instructions read:

> Open the envelope containing the target picture. Examine it for half a minute or so, and then put it back in the envelope and out of sight behind you. For the next 15 minutes, just hope that your percipient succeeds on the trial. Don't pay any attention to the target picture or try to remember what was in it - just relax and think of your percipient succeeding.

After each half of the trial, the agent completed a questionnaire on his or her psychological state, how he or she approached the strategy, and in what ways he or she tried to experience the target in the "Experiencing" condition. When the trial was over, the agent remained in the room waiting for the experimenter.

When the experimenter returned to the laboratory, she asked the percipient to complete a short questionnaire concerning his or her psychological state (see Appendix 6). The percipient adjusted the frequency content and volume of the white noise tape so that it was both comfortably loud and pleasant to listen to, and lay down on the reclining chair. The experimenter affixed two halved ping-pong balls over the percipient's eyes and adjusted the red lamp overhead so that the illumination level was comfortable. The experimenter instructed the percipient to describe out loud any thoughts, feelings or images which might occur to him or her during the trial and reminded the percipient that all mentation, not only visual imagery, was worth reporting. When the stopwatch read ten minutes, the experimenter placed the headphones over the percipient's ears, and the session began. The experimenter retired to the adjacent cubicle and

transcribed the percipient's mentation report which was heard via the microphone link, noting the halfway-time on the transcript. After the percipient had spent thirty minutes in the ganzfeld, the experimenter left her cubicle and switched off the red lamp to indicate that the session had ended. The percipient completed a questionnaire concerning his or her psychological state during the trial and the types of mentation which occurred during the two halves of the session (the post-session questionnaire is reproduced in Appendix 6). He or she then checked the transcript for accuracy, divided it into separate items and indicated which images were bizarre, vivid, based on recent memory, non-visual, highly-coloured, unrecognisable or fleeting.

The experimenter retrieved the target set number from her office, returned to the laboratory, and took the appropriate duplicate judging set from a locked box. She showed the percipient the judging set and asked him or her to place the pictures in rank order of his or her liking for them. Then, giving the percipient the mentation transcript, she asked the percipient to read it through carefully, asking him or her to mark the divisions which occurred separately, as in Experiment One, and to place the pictures in rank order of their overall correspondence to the mentation. Having recorded the percipient's judgements, the experimenter fetched the agent to provide feedback for the percipient.

At the end of the experiment, the transcript and target set from each trial was sent to the two independent judges, who were asked to rate each mentation item on a 0-10 scale for its correspondence to each picture in the set, and to use the point sums for each picture as a guide for assigning an overall correspondence rating on a scale of 0-100, also placing the pictures in rank order of correspondence (again, with a rank of 1 being assigned to the picture with the best correspondence, down to a rank of 4

to the picture with the least correspondence).

Although the judges' instructions were similar to those in the first experiment, there were some differences. The judges were told of the instructions given to the agents in the "Experiencing" condition, and asked to bear in mind not only what the target picture contained, but also what the agent might have been doing in response to the instructions in part of the trial (although the judges were not informed of the order of the conditions for any trial). In addition, the judges were instructed to ignore, in their allocations of item-by-item rating points, whether the percipient mentioned that the mentation had been particularly vivid, or had been memory-related, or possessed other such distinctive qualities, so that the judges' own theories concerning which types of mentation should be successful would not affect the results more strongly than was avoidable. Finally, each judge was asked to state, for each trial, whether he thought the trial had been successful or not, and on what basis he had made his judgement. The instructions given to the independent judges are reproduced in Appendix 8.

4.3. Results

4.3.1. Overall Performance

Contrary to prediction, the average sum of ranks assigned to the targets by the two judges was not significantly below chance (sum of ranks = 53.5, MCE=50.0), but instead, slightly above, indicating slightly below-chance scoring (since a low target rank indicates above-chance scoring). The distribution of ranks assigned to the target for each judge is shown in the table below:

Target rank distribution for each judge

	RANK				SUM OF RANKS	MCE
	1	2	3	4		
JUDGE 1	4	5	5	6	53	50
JUDGE 2	1	8	7	4	54	50
TOTAL	5	13	12	10	107	100

4.3.2. Comparison of Agent Strategies

(i) Nine out of twelve percipients who noted a difference in the amount of dreamlike imagery in the two halves of the trial experienced more dreamlike imagery in the "Hoping" half (binomial p=0.073, 1-tailed); the result is therefore in the predicted direction, although not significantly so.

(ii) There was no indication that percipients experienced imagery more varied in form during the "Experiencing" than "Hoping" condition, contrary to prediction; in total, percipients during each condition reported 40 different kinds of imagery, according to their questionnaire responses.

(iii) Chi-squared tests (one-tailed) were used to compare the number of times the percipients reported the same kind of imagery (visual, auditory, olfactory, taste, tactile, motion, emotion, or sense of atmosphere) as the agent, but in no case did any of the associated probability values remotely approach significance (all being >0.10).

(iv) Only seven out of twenty percipients correctly guessed the order of the conditions, contrary to prediction. Their responses to the questionnaire item asking them to justify their guess indicated that most felt that the occurrence of unusual, spontaneous, and vivid imagery indicated that the "Experiencing" condition was in operation.

(v) There was no significant difference between the mean target Z-scores based on the sum of item-by-item correspondence rating points in the "Experiencing" and "Hoping" conditions as tested by the related t-test

(for Judge 1, t=−1.138, Judge 2, t=−0.873, 19df, $p>0.10$ in both cases) and the sign test (for Judge 1, 12 negative, and 7 positive differences; for Judge 2, 11 negative differences and 9 positive differences; $p>0.10$ in both cases).

4.3.3. Agent questionnaire measures

Pearson correlations between the agent questionnaire measures and the target Z-score on each trial are shown in the table below, separately for each judge. Variables labelled EXP and HOPE are from the questionnaires following the "Experiencing" and "Hoping" conditions respectively.

Agent measure correlations with scoring

VARIABLE	HIGH SCORE INDICATES...	CORRELATION WITH Z-SCORE	
		JUDGE 1	JUDGE 2
EXP1	Enjoyment of strategy	0.10	0.24
EXP2	Time hoping for success	0.15	0.37
EXP3	Time thinking of target content	0.01	0.20
EXP4	Time thinking of percipient	-0.05	0.19
EXP5	Low motivation	-0.35	-0.34
EXP6	Anxiety to succeed	0.19	0.06
EXP7	Lack of conscious effort	-0.20	-0.23
EXP8	Certainty of no ESP occurring	-0.39	-0.14
EXP9	Realistic experience of target	0.01	0.17
HOPE1	Enjoyment of strategy	0.28	0.11
HOPE2	Time hoping for success	0.52*	0.09
HOPE3	Time thinking of target content	-0.30	-0.17
HOPE4	Time thinking of percipient	0.63**	0.07
HOPE5	Low motivation	-0.43*	-0.10
HOPE6	Anxiety to succeed	0.53*	-0.14
HOPE7	Lack of conscious effort	-0.53*	-0.14
HOPE8	Certainty of no ESP occurring	-0.26	0.15

* $p<0.05$, 2-tailed
** $p<0.01$, 2-tailed

Correlations between Z-scores and the agent's enjoyment of the strategies were, as predicted, positive for both judges in both conditions, but not significantly so, as was also the case for three of the four correlations with the agent's certainty that ESP had occurred. Contrary to prediction, three of

the four correlations with the agent's anxiety to succeed were positive, that for Judge 1 in the "Hoping" condition being, by a post-hoc two-tailed test, significant at the 0.05 level, and all four correlations with the lack of conscious effort made by the agent were negative, again significantly so according to a post-hoc two-tailed test for the result of Judge 1 in the "Hoping" condition.

All other significant agent correlates with performance were obtained by Judge 1 in the "Hoping" condition with time spent hoping for success ($r=0.52$, $p<0.05$), time spent thinking of the percipient ($r=0.63$, $p<0.01$), motivation ($r=0.43$, $p<0.05$), anxiety to succeed ($r=0.53$, $p<0.05$) and amount of conscious effort ($r=0.53$, $p<0.05$) correlating positively with the percipient's success.

There was, however, a considerable degree of intercorrelation between the various scales and so the questionnaire data were factor analysed using the principal components method, with iterations, and an orthogonal varimax rotation. The most reasonable solution (in terms of the factors being psychologically interpretable) for both percipient and agent data involved the extraction of four factors each, and the correlations between scores on these factors and ESP Z-scores were calculated after the number of factors had been established. Item loadings on the factor scales and the correlations between the factor scales and Z-scores are shown in the table below.

Agent Measure factor scores

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
EXP1	0.055	0.052	-0.015	0.937
EXP2	0.566	0.458	0.218	-0.096
EXP3	0.780	-0.112	-0.220	0.160
EXP4	-0.119	0.587	0.049	-0.029
EXP5	-0.740	0.027	-0.404	-0.118
EXP6	0.749	0.089	0.401	-0.107
EXP7	-0.915	0.122	0.052	-0.027
EXP8	0.097	0.489	-0.368	-0.416
EXP9	0.079	-0.120	0.089	0.839
HOPE1	-0.094	0.032	0.667	0.247
HOPE2	0.302	-0.576	0.478	0.385
HOPE3	0.219	0.645	0.050	0.060
HOPE4	0.138	-0.761	0.380	-0.004
HOPE5	-0.402	0.185	-0.852	0.043
HOPE6	0.134	-0.306	0.855	-0.073
HOPE7	-0.580	0.582	-0.211	-0.364
HOPE8	-0.048	0.710	-0.390	-0.082
CORRLN. J1	0.17	-0.36	0.45	0.04
WITH J2	0.23	0.10	0.07	0.21
Z-SCORE				

FACTOR LABELS:
Factor 1: In EXP, high motivation and time spent hoping for success and thinking of the target content.
Factor 2: Degree to which agent did not use appropriate strategy and was certain of failure.
Factor 3: In HOPE, enjoyment of this strategy, time spent hoping for success and high motivation.
Factor 4: Enjoyment of EXP and degree of realistic experience of target.

The only significant correlation to emerge was that between the Z-scores and Factor 3, which related, in the "Hoping" condition, to the agent's enjoyment of the strategy, time spent hoping for the percipient's success, and degree of motivation ($r=0.45$, $p(\text{two-tailed})<0.05$).

The characteristics of the data are summarised in the table below:

Descriptive statistics for agent questionnaire measures

VARIABLE	N	MEAN	S.D.
EXP1	19	73.6	13.8
EXP2	20	50.4	31.5
EXP3	20	81.8	19.2
EXP4	20	27.6	22.4
EXP5	20	27.5	27.5
EXP6	20	60.9	22.6
EXP7	19	25.1	26.0
EXP8	20	19.7	14.3
EXP9	20	73.2	15.3
HOPE1	20	45.0	19.1
HOPE2	20	72.0	19.1
HOPE3	20	20.9	18.9
HOPE4	20	69.7	17.2
HOPE5	20	27.5	21.2
HOPE6	20	54.7	21.6
HOPE7	19	23.8	16.9
HOPE8	20	34.7	24.6
J1 Z-SCORES	20	-0.09	0.94
J2 Z-SCORES	20	-0.16	0.81

4.3.4. Percipient questionnaire measures

Pearson correlations between the percipient questionnaire measures and the target Z-score on each trial are shown in the table below, separately for each judge. Variables labelled PRE and POST are from the pre and post session questionnaires respectively.

Percipient measure correlations with scoring

VARIABLE	HIGH SCORE INDICATES...	CORRELATION WITH Z-SCORE JUDGE 1	JUDGE 2
PRE1	Relaxation	0.36	0.18
PRE2	Bad mood	0.17	0.24
PRE3	Certain of success	-0.36	-0.26
PRE4	Low motivation	0.43*	0.48*
POST1	Relaxation	-0.39	-0.66***
POST2	Bad mood	0.34	0.57**
POST3	Certain of success	-0.26	-0.03
POST4	Spontaneous, bizarre imagery	-0.47*	-0.34
POST5	Effortful imagery	0.14	0.06
POST6	Anxiety to succeed	0.04	-0.28
POST7	Pleasant experience in ganzfeld	-0.28	-0.48*
POST8	Time spent in ASC	-0.16	-0.12
POST9	Estimated time in ganzfeld	0.13	0.10

* $p<0.05$, 2-tailed
** $p<0.01$, 2-tailed
*** $p<0.001$, 2-tailed

As predicted, the correlation of the Z-scores with pre-session relaxation were positive for both judges, but not significantly so. Anxiety to succeed correlated non-significantly positively for Judge 1, and negatively for Judge 2. However, the directions of all the other predicted correlations were the reverse of those predicted, some significantly so according to post-hoc two-tailed tests of signficance. Pre-session bad mood correlated positively with scoring for both judges; pre-session expectation of success correlated negatively for both judges; post-session relaxation correlated negatively with success for both judges, and significantly so for Judge 2 ($r=-0.66$, $p<0.001$); post-session bad mood correlated significantly positively with success for both judges, and significantly so for Judge 2 ($r=0.57$, $p<0.01$); the amount of spontaneous, bizarre imagery experienced during the trial correlated negatively with success for both judges, and significantly so for Judge 1 ($r=-0.47$, $p<0.05$); and effort for imagery correlated positively with success for both judges.

Concerning those variables about which no predictions were made, pre-session low motivation correlated significantly positively with success for both judges (for Judge 1, $r=0.43$, and for Judge 2, $r=0.48$, $p<0.05$ in both cases), and the degree to which the ganzfeld had been a pleasant experience correlated significantly negatively with success for Judge 2 ($r=-0.48$, $p<0.05$).

Because of the high degree of intercorrelation observed between the various scales, however, the questionnaire data were factor analysed in the same way as the agent's questionnaire data. Four factors were extracted, and the loadings of the questionnaire measures on these factors, and the correlations between scores on these factors and the ESP Z-scores are shown in the table below.

Percipient measure factor scores

		FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
PRE1		0.016	0.135	0.179	0.826
PRE2		-0.484	-0.419	-0.197	-0.035
PRE3		0.036	0.859	0.294	0.039
PRE4		-0.351	-0.481	-0.407	0.551
POST1		0.849	0.006	0.090	0.084
POST2		-0.797	-0.240	-0.353	-0.276
POST3		0.353	0.506	0.480	0.269
POST4		0.320	0.010	0.783	0.183
POST5		-0.306	-0.816	0.216	-0.205
POST6		-0.241	-0.111	0.015	-0.778
POST7		0.854	0.404	-0.006	-0.021
POST8		0.120	0.068	0.820	-0.152
POST9		-0.312	0.193	0.440	0.185
CORRLN.	J1	-0.39	-0.15	-0.23	0.26
WITH	J2	-0.61	-0.02	-0.16	0.36

Z-SCORE
FACTOR LABELS:
Factor 1: Good mood before and after pleasant and relaxing ganzfeld
Factor 2: Confidence of success before and after ganzfeld, highly motivated.
Factor 3: Bizarre, spontaneous imagery, experience of ASC, large time estimate, confidence of success.
Factor 4: Relaxed and unmotivated.

The only significant correlation was the negative correlation of the Z-scores of Judge 2 with Factor 1, which related principally to the percipient experiencing a good mood before and after a ganzfeld which was pleasant and relaxing ($r=-0.61$, $p(\text{two-tailed})<0.05$).

The characteristics of the percipient questionnaire data are shown in the table below:

Descriptive statistics for percipient questionnaire measures

VARIABLE	N	MEAN	S.D.
PRE1	20	59.6	22.9
PRE2	20	33.0	21.0
PRE3	20	54.4	15.9
PRE4	20	28.9	22.0
POST1	20	72.0	25.0
POST2	20	30.3	17.0
POST3	20	42.2	23.1
POST4	20	73.2	15.8
POST5	20	30.1	24.3
POST6	20	48.0	26.6
POST7	20	68.8	25.5
POST8	20	57.6	25.2
POST9	20	21.0	9.9

4.3.5. Identification of successful trials

(i) It was predicted that those trials on which one picture stood out above the rest in terms of correspondence to the mentation report would be more likely to be successful than those trials on which all of the pictures in the target set corresponded roughly equally to the mentation report. If this were the case, a negative Spearman correlation would be expected between the rank assigned to the target and the Z-score of the most highly-rated picture on each trial. For Judge 1, $r=+0.18$ and for Judge 2, $r=-0.29$ ($p>0.10$ in both cases).

(ii) The distribution of target ranks on those trials which the judges were confident would be successful are shown in the table below.

Distribution of target ranks on trials about which judges were confident

	TARGET RANK				MEAN
	1	2	3	4	RANK
JUDGE 1 CONFIDENT	3	2	2	1	2.12
JUDGE 2 CONFIDENT	0	2	1	0	2.33
J1 UNCONFIDENT	1	3	3	5	3.00
J2 UNCONFIDENT	1	6	6	4	2.76

There was a tendency to reverse the slight overall psi-missing trend on the

trials about which the independent judges were confident, with mean target ranks for both judges being lower on the trials about which they were confident, and slightly above chance. The difference between the mean target ranks on the two types of trial was significant for Judge 1 (t=1.780, 18df, p(one-tailed)<0.05), but not so for Judge 2 (t=1.048, 18df, p(one-tailed)>0.10).

4.3.6. Mentation Categories

As for Experiment One, it had been planned to test whether percipients scored particularly well on the basis of certain categories of mentation (bizarre, fleeting, based on recent memory, vivid, non-visual, unstructured, or highly coloured) by comparing the percentage of item-by-item rating points assigned to the target by all subjects combined on the basis of each category to scoring on the remainder. However, since this analysis proved to be invalid, the Wilcoxon Test was used to compare the proportion of item-by-item correspondence rating points allocated to the target on the basis of each mentation category with the proportion allocated on the remaining mentations (MCE=25%). It was predicted that scoring would be significantly above chance on the basis of imagery which was bizarre, fleeting or non-visual. However, because the reversal of the usual correlates of success for the percipient may have suggested psi-missing (see Discussion) all tests for significance were, post-hoc, two-tailed.

The results are shown in the table below.

Percentage of points allocated to target for Judge 1

MENTATION CATEGORY	% PTS ON CATEGORY	% PTS ON REMAINDER	N	T	P(2-T)
Bizarre	27.3	28.3	12	22	>0.10
Fleeting	23.1	29.5	18	57	>0.10
Memory	19.6	28.6	7	7	>0.10
Vivid	24.9	29.8	18	77	>0.10
Non-visual	23.6	29.8	19	90	>0.10
Unrecognisable	36.3	27.4	15	40	>0.10
Highly coloured	23.8	29.0	12	36	>0.10

Percentage of points allocated to target for Judge 2

MENTATION CATEGORY	% PTS ON CATEGORY	% PTS ON REMAINDER	N	T	P(2-T)
Bizarre	21.3	24.5	12	25	>0.10
Fleeting	16.9	25.7	17	26	<0.02
Memory	23.1	24.0	6	7	>0.10
Vivid	24.6	23.6	17	66	>0.10
Non-visual	19:6	25.5	20	82	>0.10
Unrecognisable	30.3	23.1	14	47	>0.10
Highly coloured	26.2	23.5	12	29	>0.10

The only significant result was that of scoring on fleeting mentation being significantly worse than on the remainder (p(two-tailed)<0.02).

4.3.7. Picture preference measures

As predicted, percipients ranked the pictures in the target set for correspondence with their mentation in accordance with their liking for the pictures to a significant degree (binomial p=0.02, 1-tailed, comparing the 13 positive and 3 negative Kendall tau values obtained by matching liking ranks and correspondence ranks). However, both independent judges also ranked pictures in accordance with the percipients' liking ranks; for Judge 1, 12 positive and 4 negative tau values were obtained, and for Judge 2, 13 positive and 5 negative tau values were obtained (p(one-tailed)<0.02).

As in Experiment One, a post-hoc comparison of the target rank sums assigned by the percipients on the basis of their judgements of the

correspondence of the pictures in the set to the mentation, and on the basis of liking, was conducted to see how liking and correspondence ranks compared as measures of psi. The distributions of the two sets of ranks are shown in the table below (MCE=2.5).

Target liking and correspondence rank distributions for percipients

	RANK				MEAN
	1	2	3	4	RANK
CORRESPONDENCE	3	4	6	7	2.85
LIKING	4	4	6	6	2.70

The two rank sums differed only slightly, both being below chance, with the liking rank sum (54) being closer to chance (50) than the correspondence rank sum (57).

4.4. Discussion

Overall, scoring according to the independent judges was not significantly above chance as predicted, but non-significantly below, with a mean target rank of 2.7 as compared to the chance expectation of 2.5.

While nine out of the twelve percipients who noted a difference in the amount of unstructured, irrational imagery in the two halves of the trial experienced more such imagery in the "Hoping" half, as predicted, the result did not reach significance ($p=0.073$), although the fact that the result approached significance with a sample size of only twelve may be an indication that this hypothesis should be tested in a larger study. However, in future research, the comparison of two conditions which more clearly differ in the "structuredness", or rationality of the agent's task would be advisable, since it is possible that the two tasks used here could have been approached by agents in ways other than those intended by the experimenter; for example, for some agents, deciding what to do during the

"Experiencing" condition might have involved a spontaneous, creative element, while the "Hoping" condition might have seemed restrictive to some agents. Since no questionnaire measure directly concerned with the agent's perceived rationality of the task was included, and since no pre-testing was carried out,even the merely suggestive result here may not be interpretable in the intended manner.

A finding consistent with this tendency for more irrational mentation to be reported during the "Hoping" condition was that most (13 out of 20) percipients wrongly guessed which condition was which, since the percipients' responses to the questionnaire item asking them to justify their guess indicated that they expected unusual, spontaneous, and vivid imagery to be associated with the "Experiencing" condition. Further discussions with several percipients concerning their responses elicited the information that the percipients tended to feel that, because they had experienced unusual and vivid imagery, and because the experience of such imagery was not "natural" for them, they had ascribed the experience to an external agency, namely, the agent.

Scoring did not differ significantly between the two conditions, and there was no indication that percipients experienced imagery more varied in form, or in the same particular modalities as the agent, in the "Experiencing" condition. Indeed, even if the percipients had experienced imagery in the same modalities as the agent, this result would have been suspect because the percipient and agent had been exposed to the same environment immediately before the trial; for example, if both had drunk coffee before the trial, or if the experimenter had inadvertantly stressed the use of taste imagery in her description of events, both percipient and agent might have involved themselves in imagery relating to taste. A design which would avoid such a problem would be to have had the agent instructed to use

only certain modalities of imagery on a randomly-applied, counterbalanced basis, to which the percipient, agent, and experimenter would have been blind before the trial began.

Another problem with the experimental design, which may have tended to obscure any differences between the two conditions, could have been the use of the split-session, same-subjects design, since the effects of either condition appearing in the first half of the trial might have been such that they would still be in operation during the second half. For example, if target-related mentation, or imagery in the modalities used by the agent in the "Experiencing" condition occurred during the first half of the session, similar mentation might also be likely to appear in the second half if the percipient tended to associate to his or her imagery earlier in the trial. A more appropriate design would have been to use a between-subjects comparison of two groups, each group taking part in a different condition.

Although the directions of the correlations of the agent's enjoyment of the strategy and of his or her certainty that ESP had occurred with scoring were generally positive, as predicted, none of the correlations were significant. However, contrary to prediction, scoring correlated positively with the agent's anxiety to succeed and negatively with his or her lack of conscious effort, significantly so for both variables for Judge 1 in the "Hoping" condition according to a post-hoc two-tailed test (both $p<0.05$). If these results are not simply the products of overanalysis, it is probable that the reversal of the correlates from the predicted direction was attributable to the fact that at least some percipients reported having interpreted the scales as measures of motivation, with "anxiety to succeed" and "conscious effort" being synonymous with "high motivation"; future attempts to break down the measure of motivation into its components

would probably benefit from less ambiguous questions, accompanied by pre-testing of questionnaires.

A number of significant correlates of scoring appeared among other agent measures, all in the "Hoping" condition with the scores of Judge 1. Following factor analysis of the agent measures, which tended to be highly intercorrelated, a factor representing, in the "Hoping" condition, enjoyment of the strategy, time spent hoping for success, and high motivation, correlated significantly with the scores of Judge 1 ($r=0.45$, $p(\text{two-tailed})<0.05$). Again, however, this result could be due to multiple analysis.

Factor analysis was also performed on the measures of the percipient's psychological state, which also tended to be highly intercorrelated. For Judge 2 there was a significant negative correlation ($r=-0.61$, $p<0.01$, 2-tailed) between Z-scores and scores on a factor scale composed of good mood, pleasantness of ganzfeld experience and post-ganzfeld relaxation, although, again, it is possible that this significant finding is the result of over-analysis. However, Palmer, Bogart, Jones and Tart (1977) found a significantly negative correlation between ESP scores and scores on an ASC factor scale in a ganzfeld study in which scoring overall was significantly below chance by judges' ratings, and discussed their result in terms of Palmer's (1975) Model One, predicting that when the overall score in a study is negative, the correlation between ASC ratings and ESP scores should be negative. In the present study, all the "classic" percipient correlates of success tended to be reversed, but the overall score was only very slightly negative (a sum of ranks of 53.5, with a chance expectation of 50.0). There is thus a little support for the prediction of Palmer et al, but a less miniscule overall deviation from chance would have made this support somewhat greater, as would the presence of more

significant correlations between the psychological factor scores and ESP scoring.

There was no indication that trials on which one picture stood out above the rest were more likely to be successful than those trials on which all corresponded equally well, with the relationship between the target Z-scores and target ranks being slightly negative for one judge and slightly positive for the other. However, since overall scoring differed so little from chance expectation, such an analysis would not be expected to be successful.

However, the investigation of the judges' ability to identify successful trials proved rather more interesting, with scoring being significantly higher on those 8 trials about which Judge 1 was confident than on the remainder ($p(\text{one-tailed}) < 0.05$); scoring was also higher than on the remainder on the 3 trials about which Judge 2 was confident, although not significantly so, the lack of significance possibly being due in part to the small number of trials for which success was predicted. For both judges, scoring on the trials about which they were confident was slightly above chance, while scoring on the remaining trials was slightly below. Again, if the significant result here is not just due to over-analysis, this result is interesting since it seems to have involved the separation of high-scoring and low-scoring trials, as opposed to the separation of high-scoring and chance-scoring trials. Given that overall scoring did not differ from chance, this result might indicate that overall scoring was not purely due to chance, but to a mixture of psi-hitting and psi-missing. Also interesting was that the judges' comments, although consisting largely of flippant remarks concerning the percipients' mentation, seemed to indicate that they had been confident about trials on which individual items of mentation, particularly unusual (although not necessarily bizarre) ones, had

corresponded spectacularly well to one, and only one, picture in the target set. This in turn might shed some light on the failure of the Z-scores to similarly distinguish between high and low-scoring trials, since it would be expected that the judges took spectacular individual item matches into account when assigning the overall correspondence ratings to each picture upon which the Z-scores were based. A Z-score is only an indication of the extent to which one picture stands out above the average of the other three in the set, but directly reveals nothing of the pattern of scoring across the four pictures; if it is important, in identifying successful trials, that a very good match occurs with only one picture in the set, and not with the others, then a Z-score would probably not be the most sensitive measure to use. For example, if two pictures in the set corresponded very well to the mentation, while the others in the set corresponded very badly, the Z-score of the highest-rated picture in the set would be quite high, despite the fact that another picture in the set also corresponded very well to the mentation. An observation which might be relevant was that, on a number of trials, it seemed that a percipient would obtain very good correpondences indeed with two or three pictures in the set, on which occasions the target would usually be the fourth-ranked picture, to which almost no correspondence occurred; that is, it seemed as though low scoring on the target was accompanied by displacement to two or three pictures in the target set. If it is the case in general that when displacement occurs in an experimental context such as this one, it occurs to two or three pictures, then the pattern of scoring on a trial may serve to distinguish, in advance of feedback, between trials on which psi-hitting occurs, and trials on which psi-missing occurs. The author would place very little evidential value on this observation as it stands, being post-hoc and only anecdotal; however, predictions based on this informal observation

were followed up on a pre-planned basis in the next experiment, and will be discussed in detail in the following chapter.

The only significant result to emerge from the investigation of scoring on the basis of particular mentation categories was that scoring on the basis of fleeting imagery was significantly worse, according to a post-hoc two-tailed test ($p<0.02$) than on the remainder for Judge 2, with scoring being below chance (16.9%, with an MCE of 25.0%) for fleeting imagery, and slightly above (25.7%) on the remainder. Contrary to prediction, scoring on bizarre and non-visual imagery was not significantly different from chance. Again, since this result was the best of 14 imagery analyses, it may have resulted from over-analysis; otherwise, the fact that scoring on fleeting imagery was significantly worse, not better, than scoring on the remaining imagery might relate to the tendency for the usual correlates of the percipients' psychological state with scoring to be reversed in this study; if the percipients were tending to psi-miss or displace (leading to below-chance scoring on the target), then relationships of psychological variables to scoring would tend to reverse. This being the case, it would have been more appropriate to have planned to use two-tailed, rather than one-tailed tests for those analyses which were not necessarily directionally specific.

Although as before percipients ranked pictures which they liked highly in terms of correspondence to their mentation ($p<0.02$, 1-tailed), both judges also ranked pictures in accordance with the percipients' liking ranks ($p<0.01$, 1-tailed). Either both judges and percipients allowed themselves to be unduly influenced in their judging by their liking for the same pictures, or the percipients happened to like best those pictures which really did match their transcripts best as demonstrated by the judges or, perhaps the percipients liked pictures because, and to the extent that

they seemed to match the mentation. It seems unlikely that the percipients' liking swayed their correspondence judgements, since the independent judges would be expected to be less emotional than the percipients in their judging, for reasons already discussed, and because it seems unlikely that percipients and judges should share the same taste in pictures to such a degree (especially considering the rather constrained variance of the measures of the percipients' attitudes towards the pictures in Experiment One). Nevertheless, it would seem advisable to introduce a picture preference questionnaire for independent judges in future research.

In summary, little emerges with any certainty from this study, especially considering the large number of analyses conducted, and the post-hoc nature of many of the tests. However, the suggestive findings concerning the possibility that one of the independent judges may have been able to detect high-scoring trials, and that this ability may have related to a further possibility that trials on which displacement occur may be identifiable on an individual basis before feedback, were considered sufficiently interesting and potentially valuable that they were examined in the following study, along with a more general investigation of the role of the independent judge.

CHAPTER 5

EXPERIMENT THREE: THE IDENTIFICATION OF TARGET-RELATED MENTATION IN ADVANCE OF FEEDBACK

5.1. Introduction

After the previous experiment, it was decided to follow up the results concerning the apparent ability of one of the two judges to identify successful trials before feedback, and to examine the relative success of using various aspects of a trial to make such identifications. Although the free-response methodology has become very popular in ESP research over the last decade, there is no research-based consensus as to what might be the best ways of judging the correspondence between a percipient's mentation report and the pictures in the judging set. It could be that the 'best' judges, that is, those who seem able to select the target on the basis of a mentation report, may not just be simply 'objectively' determining the correspondence between a picture and mentation, but may have developed a successful judging strategy based on giving more weight to particular responses which have certain distinguishing characteristics than to others, or by using some kind of information, other than a judgement of overall correspondence, in assigning correspondence ratings at the end of a trial. If factors affecting the judging process were better understood, scoring could be improved.

The study described here was an attempt to investigate various ways of optimising scoring by identifying mentation most likely to be target-related, in advance of feedback. The author independently judged data from a ganzfeld GESP experiment by Deborah Delanoy (Delanoy 1986) in which twenty percipients took part in two trials each. Although the participation of the author as the independent judge in this study made it

possible that some of her hypotheses might be fulfilled by means of her own psi, rather than because the hypotheses actually applied to the data, it was felt that the insights which she would gain during the process would be necessary to acquire before designing an experiment sufficiently well-documented in terms of possibly ambiguous areas of procedure for other independent judges to take part in. An additional, pragmatic reason for using the author as independent judge was that the judging process for the entire experiment took some 150 hours of concentrated effort, and no other experienced judge with sufficient time was available.

Six main areas of inquiry were of interest, namely, what kind of correspondence (literal, formal, and so on) would best identify the target; which kinds of mentation would best identify the target; whether spectacular individual correspondences between mentation items and pictures in the set or overall correspondence ratings were better indicators of the target; whether successful trials could be identified by high Z-scores, the occurrence of good matches between individual mentation items, or the style of the percipient's imagery during the session; whether the occurrence of displacement could be pinpointed by means of the pattern of scoring across the pictures in the target set; and whether the judge's liking for the pictures in the set affected her judgement of correspondence.

Harvey Irwin (1979) pointed out that examining the ways in which paranormally-mediated thoughts relate to a target could help to identify the point at which psi information enters the cognitive system. He cites the anecdotal findings of Ehrenwald (1976) and Warcollier (1948/1963) that percipients' drawings of ESP targets tend to be visually rather than semantically accurate, and within the context of a human information processing approach to cognition, develops a model in which psi enters the system at the level of memory. Irwin suggests that the primitive features

of the psi-activated memory traces undergo a process of pattern recognition where error may first occur. Thereafter the recognised material is given a visual and/or name code and subjected to semantic analysis, all of which processes may also be subject to error. Although free-response percipients are typically instructed to watch out for literal, formal, symbolic, associative and thematic correspondences, the relative importance which should be attached to these kinds of correspondence is currently unclear. Irwin's model would, on the face of it, seem to seem to suggest that there should be least error at the lowest levels of processing, that is, that formal information should be more reliable than semantic information. However, it is possible that even if both formal and semantic correspondences carried equal amounts of psi information, formal correspondences might appear to be more accurate than semantic correspondences, simply because formal correspondences might be easier to spot. Irwin's approach becomes even more difficult to test empirically if one admits the possibility of models of cognition in which, for example, the pattern analyser is influenced by the results of semantic analysis in a reiterative process; within such a model, errors might appear at any stage. Nevertheless, a comparison of the relative accuracy of various types of correspondence would still be useful, since if a large proportion of people show the same pattern of accuracy, whatever the reason, or if differences between subjects could be related predictably to an independent measure of cognitive style, subjects could in future be instructed to attach greater weight to relatively successful types of correspondence, thereby improving their scores.

As well as different types of correspondences possibly differing in accuracy, it may be that certain kinds of mentation remain constant in their relationship to the target in certain kinds of ways. For example, images which percipients can describe in terms of their features but which they do

not recognise as identifiable objects may have undergone little or no processing since the stage of being encoded in terms of formal features and so might be expected to be more formally accurate than a fully developed and recognisable image. Three questions concerning these issues were formulated:

(i) How does performance on the basis of each of the different types of correspondence compare to chance?

(ii) Is formal information or semantic information more accurate?

(iii) Is formally developed (that is, developed in terms of shape or colour) but unrecognisable imagery more formally accurate than all other imagery?

Since the author, rather than the percipients, was to categorise the mentation, it was decided to expand the number of imagery categories under investigation in the present study, drawing mainly upon anecdotal sources to determine which categories would be of interest, but also including some categories associated with altered states of consciousness which may also be associated with the production of psi, as discussed in the introductory chapter. Two related questions were formulated:

(i) How does performance on the basis of various mentation categories compare to chance?

(ii) Could performance on the second of the percipients' two trials have been improved by being given feedback which types of mentation had been successful in the first trials?

Two free-response judging procedures, the global and the atomistic, are currently used by various laboratories. In the global method, the whole mentation record is reviewed at once and an overall judgement of correspondence made. In the atomistic method, the mentation record is divided into individual items, and a variable number of "correspondence

points" are awarded to each picture according to the degree of its correspondence to each mentation item; when the judging for all items is completed, the total number of correspondence points awarded to each picture is used as a guide in selecting the target. In a typical trial, a few mentations will correspond very closely to one or more pictures in the target set, while the majority correspond less strongly. Arguably, the global judging method may place more emphasis upon the few very strong correspondences since these are likely to stand out in the judge's memory as he or she reviews the whole session's mentation. The atomistic method, on the other hand, is designed to allow both strong and weak correspondences their appropriate weights, based on the premise that even less strongly matching mentations contain information which can help to identify the target, even though the information may be in a weak and distorted form. If this is so, then the global method of judging may be a relatively ineffective means of selecting the target. On the other hand, if psi appears in a more discrete, all or nothing fashion in a subject's mentations, then the atomistic method will introduce noise into the judging process. One related question was formulated:

(i) Is the target identified more efficiently by the minority of stronger matches or by the majority of weaker matches?

If successful trials could be identified before feedback, scoring could be enhanced by simply ignoring the remaining trials. Three possible indicators of success might be the nature of the percipient's mentation; the occurrence of unusually good correspondences between individual mentation items and a picture in the judging set; and the degree to which one picture stands out above the rest in its overall correspondence to the mentation.

As already discussed in the introductory chapter, Sargent (1980)

and Sargent (1982) found that success in the ganzfeld correlated with the degree to which subjects rated their session's mentation as "spontaneous, dreamlike, bizarre" as opposed to "rational, structured, directed"; Palmer, Bogart, Jones and Tart (1977) and Palmer, Khamashta and Israelson (1979) obtained consistent results in ESP score correlations with factor measures upon which this same item loaded significantly. Stanford and Neylon (1975) found that the percentage of time during which the percipients' thoughts were "random and disconnected" correlated positively with success, and Sargent (1980) found that success correlated with the effortlessness of experiencing both visual and auditory imagery. These findings suggest some desirable characteristics of mentation which could be used to make "confidence calls" about the outcome of a trial, namely, spontaneity, bizarreness, and lack of structure and interconnectedness.

In the previous study, one of the independent judges seemed able to pick out successful trials on the basis of the occurrence of spectacular matches between individual mentation items and a single picture in the target set, while the obtaining of a high Z-score did not similarly identify high-scoring trials. As already discussed, this may have been because a Z-score carries little information about the pattern of scoring across the four pictures in the set; however, it seemed that a comparison of the efficacy of the two types of confidence call would be interesting. Three related questions were formulated:

(i) How did scoring on those trials which received the three different types of confidence call (based on nature of transcript, outstanding overall corespondence to one picture, and outstanding individual mentation item correspondences to one picture) compare to the remaining trials?

(ii) How did scoring on those trials which received all three types of confidence call compare to chance?

(iii) was the occurence of a few good individual matches or an outstanding overall correspondence the better basis for making confidence calls?

In the previous experiment, it was observed that on some trials in which the target was ranked low, marked displacement seemed to occur to two or sometimes three pictures in the set. If such a pattern of scoring is a hallmark of displacement, it could be used to identify trials on which displacement has occurred before feedback, thereby providing the option of choosing to ignore the outcome of such trials, and improving overall performance.

One related question was formulated:

(i) Was scoring less than chance on those trials in which two or more pictures in the target set corresponded unusually well to the mentation?

The final area of interest follows on from the finding in the previous study that both percipients' and independent judges' correspondence judgements were aligned to a statistically significant degree with the percipients' liking of the pictures in the sets. It was not clear whether percipients had liked those pictures to which the mentation really had corresponded best, or whether the independent judges had shared the percipients' liking for the pictures and allowed themselves to be swayed in their correspondence judgements. Although the latter possibility seemed unlikely, it was decided to include in this study a measure of the independent judge's liking for the picture in the set to examine for such a bias. The possibility that any such bias could be exploited to identify high-scoring trials was also explored; as Stanford (1967) has suggested in his response-bias hypothesis, if a bias against giving a particular response exists, then scoring should be higher on counter-bias responses, in this

case, on those trials on which correspondence ranks are misaligned with liking ranks.

Two related questions were examined:

(i) Did liking for the pictures in the set bias judgement?

(ii) If such a bias exists, was scoring higher on those trials on which the bias was overcome?

5.1.1. Planned Analyses

In summary, the following analyses were planned before the experiment began (because of the possibility of psi-missing, all analyses were two-tailed, with the exception of the test for psi-missing on those trials on which displacement was expected to occur, and the comparison of scoring on trials for which "confidence calls" had been made with scoring on the remaining trials, which were one-tailed).

Overall scoring

(i) It was planned to compare overall scoring to chance, using the sum-of-ranks analysis of Solfvin et al (1978) to compare the sum of ranks assigned to the target with mean chance expectation.

Correspondence types

(i) It was planned to compare scoring on the basis of a number of correspondence types to scoring on the remaining types; full details of the planned analysis and of that which replaced it when it was discovered to be invalid, are given in the results section.

(ii) It was planned to compare scoring on the basis of formal correspondences with scoring on the basis of literal correspondences, using the analysis as in (i) above.

(iii) It was planned to compare scoring on the basis of formal correspondences of "unrecognisable" mentation with scoring on the basis of formal correspondences of the remainder, using the analysis as in (i) above.

Imagery categories

(i) Scoring on the basis of a number of categories of mentation was to be compared to scoring on the basis of the remainder, using the analysis as in (i) above for the correspondence types.

(ii) For those mentation categories on which scoring had been significantly higher than on the remainder (according to the analysis as in (i) for the correspondence types), it was planned to apply weightings, calculated from the first trial scores to the scores on the same categories in the second trials, using the weighting scheme devised by Burdick and Roll (1971), and to compare performance on the second trials using the sums of ranks obtained with the weighted and unweighted correspondence point sums, to see if scoring in the second trials could have been improved by knowledge of performance in the first trials.

Scoring on weak versus strong correspondences

(i) It was planned to compare scoring on strong and on weak correspondences by re-ranking the pictures on each trial according to 'strong' correspondence point sums (using points of 3 or more) and according to 'weak' correspondence point sums (using points of 2 or less), and comparing the two sums of target ranks using Solfvin et al's (1978) sum-of-ranks analysis.

Confidence Calls

(i)It was planned to compare scoring on the basis of trials receiving each of the three different types of confidence call to scoring on the remainder by comparing the mean rank assigned to the target on the remaining trials, using the unrelated t-test.

(ii) It was planned to compare scoring on the basis of those trials which received all three types of confidence call with those that did not, using the above analysis.

(iii) It was planned to compare scoring on trials which received confidence calls based on a high Z-score, with those that received confidence calls based on excellent correspondences of individual mentation items, using the analysis as in (i) and (ii) above.

Identification of displacement

(i) It was planned to examine whether the mean target rank on those trials on which displacement had been expected to occur was lower than the mean target rank on the remaining trials, according to the analysis used above.

Bias due to picture liking

(i) The number of positive and of negative values of Kendall's tau to be obtained for the relationship between liking and correspondence ranks on each trial was to be compared using the binomial test, to see whether the judge allowed her liking for the pictures to sway her judgement.

(ii) If such a bias was present to a significant degree, it was planned to compare the mean target rank on those trials for which negative and positive tau values were obtained using the unrelated t-test, as an

examination of a possible response-bias effect.

5.2. Method

Full details of the experimental method used in dealing with the subjects are given in Delanoy (1986). Only those details of the procedure relevant to the present author's independent judging of the data are included here.

5.2.1. Design

The author independently judged the correspondence between 37 ganzfeld trial mentation reports and the target set for each session on a blind basis. Delanoy provided the author with the mentation tapes and target set for each percipient, which were judged in the same order as the trials occurred. Delanoy only revealed the identity of the target on each trial after the experiment had ended.

5.2.2. Subjects

Ten males and ten females (including the present author, whose data was not included in this study), ranging in age from 19 to 48, each took part in two ganzfeld trials. Delanoy acted as agent on each trial. Subjects were recruited by personal contact, mainly from Delanoy's circle of friends and from the Psychology Department's parapsychology seminar group. All but one either had or were studying for a degree.

Prior to this experiment, the independent judge (the author) had taken part in approximately ten ganzfeld trials as a percipient, and had independently judged data from one ganzfeld experiment run by another researcher.

5.2.3. Procedure

Each of the twenty subjects completed two thirty-five minute ganzfeld trials, with Delanoy acting as agent throughout. After each trial, the independent judge (the present author) transcribed the percipient's taped verbal mentation report. Having read the transcript thoroughly, she noted whether or not she was confident that the trial would be successful on the basis of the nature of the subject's mentation, describing those characteristics of the mentation which influenced her decision. She divided the transcript into individual items, corresponding as far as possible to changes in the percipient's stream of thought, dividing up apparently unrelated thoughts or those which underwent marked changes. She then noted into which, if any, of the categories of interest each mentation item fell; these categories are listed fully in Appendix 9.

Next, the judge opened the target set pack for the trial provided by Delanoy, and placed the four pictures it contained in rank order of her liking for each one. Pictures were emotionally neutral or positive art postcards, cartoons and photographs drawn from a pool of twenty sets of four contrasting pictures. She then assigned from 0 to 5 rating points to each mentation item on the basis of its correspondence with each picture in the target set, noting the type of correspondence in each case. The mentation could correspond with a picture literally, formally, conceptually, phonetically, or associatively; or several of these at once, in which case a picture could receive, for example, several "associative" points and several "formal" points for a single mentation item, since although the correspondence types were defined to avoid overlapping as far as possible, a mentation item could relate in different ways to different elements of complex pictures such as were used.

A literal correspondence was defined as indicating that mentation

item and picture content fell into the same (widely used) category. For example, if the picture was of a cat, the responses 'cat', 'dog', and 'horse' would all be considered as corresponding literally with the target since they all fall into the widely used category 'animals'. A formal correspondence indicated that the mentation related to the picture in terms of shape or colour, over and above any literal correspondence. Thus a pair of spectacles would correspond formally to a picture of a bicycle but a motorcycle, despite its formal correspondence to the bicycle, would only be allocated 'literal' points since it falls into the category of 'two-wheeled transport'.

A conceptual correspondence indicated that mentation and picture were semantically related, but not in terms of commonly-used categories. For example, an image of a goldfish in a bowl would correspond conceptually to a Magritte-type picture of a man imprisoned in an inkbottle, since both fall into the peculiar category of living things enclosed in containers for fluids.

An associative correspondence indicated that target and mentation usually went together (e.g. 'bread' and 'butter') or that the mentation supplied a clearly missing element in the picture, such as a seated man for an empty deckchair.

A phonetic correspondence indicated that a word used in describing the mentation bore a phonetic resemblance to a word which described a picture, although no semantic relationship between the two existed, such as 'boat' for 'goat'. While the author made every attempt to produce practicable categories of correspondence reflecting their common use and the instructions given to subjects concerning these various types of correspondence in the literature, it will be seen that the demarcation between these various categories are somewhat arbitrary, and in addition

rely to some extent upon the personal judgement of the independent judge. Also, some types of correspondence may be harder to spot than others, and which types are most readily apparent may vary from judge to judge. Nevertheless, an exploration of this area seemed worthwhile as a means of assessing whether more objective methods of assessment would be worth developing for later research.

When the whole transcript had been judged against the target set, the number of rating points given to each picture were summed. These sums were used as a rough, but not binding guide to place the pictures in rank order of their correspondence to the mentation (the pictures might not be ranked strictly according to correspondence point sums if the point sums were tied or very close for two or more pictures, in which case the independent judge would re-read the transcript and attempt to rank the pictures on the basis of an overall assessment) and were also used to calculate ESP Z-scores. The judge noted whether she was confident or not that the trial had been successful on the basis of outstanding matches between individual mentation items and the chosen target, and whether or not displacement was likely to have occurred according to whether or not two or more pictures corresponded particularly well to the mentation.

When the judging of all the trials had been completed, Delanoy provided the judge with the identities of the targets.

5.3. Results

Because of the possibility of psi-missing, all analyses were two-tailed, with the exception of the test for psi-missing on those trials in which displacement had been expected to occur, and the comparison of scoring on trials for which "confidence calls" had been made with scoring on the remaining trials, which were one-tailed. All analyses were planned

in advance of feedback at the end of the experiment. Data from thirty-seven of a total of forty trials were independently judged; two of the missing trials were those in which the judge was the percipient, and the third was a trial whose outcome was known to the judge before the independent judging of the experiment began.

5.3.1. Overall scoring

Overall scoring was compared to chance using the sum-of-ranks analysis of Solfvin et al (1978). In thirty-seven trials, a sum of target ranks of 81 was obtained (MCE=92.5), representing non-significant above-chance scoring (p(two-tailed)=0.11).

5.3.2. Correspondence Types

(i) The proportion of item-by-item correspondence points allocated to the target on the basis of each correspondence type (literal, formal, conceptual, and associative) was compared to the proportion of points remaining allocated to the target for each trial, using the Wilcoxon Test, which again replaced a planned analysis identical to those planned for Experiments One and Two. The number of trials for which phonetic correspondences had been noted was insufficient for the Wilcoxon Test to be applied ($N<5$). Scoring on the target on the basis of none of the investigated correspondence types was significantly better than scoring on the basis of remaining correspondences (all $p>0.10$). Overall, 29.2% of correspondence points related to the target, which is slightly above the theoretical mean chance expectation of 25.0%. 30.7% of formal points were target-related (N=37, T=304), as were 28.3% of literal points (N=37, T=298), 28.7% of conceptual points (N=37, T=250) and 31.1% of associative points (N=37, T=330).

(ii) 30.7% of formal correspondence points related to the target, as compared to 28.3% of literal points, but a Wilcoxon Test (again replacing the planned analysis) comparing the proportion of literal and formal correspondence item-by-item rating points allocated to the target on each trial failed to show a significant difference between the two (N=37, T=288, $p>0.10$).

(iii) Formally developed but unrecognisable imagery was not significantly more formally accurate than other imagery, according to a Wilcoxon Test (replacing the planned analysis) comparing the proportion of unrecognisable imagery formal correspondence rating points assigned to the target with the proportion of remaining formal correspondence points for each trial (N=32, T=227.5, $p>0.10$). On formal correspondences alone, 31.0% of correspondence points allocated on the basis of such unrecognisable imagery related to the target, as compared to 30.5% of all remaining imagery.

5.3.3. Imagery Categories

(i) The proportions of item-by-item rating points assigned to the target on the basis of each mentation category was compared to the proportion assigned on the remaining imagery for each trial, using the Wilcoxon Test (replacing the planned analysis). Out of the 18 mentation categories for which mentation occurred in a large enough number of trials ($N>4$) for the Wilcoxon Test to be applied, none showed scoring significantly greater than on the remaining imagery. The results are summarised in the table below; full descriptions of the imagery categories are contained in Appendix 9.

Percentage of points allocated to target on all trials

MENTATION CATEGORY	% PTS ON CATEGORY	% PTS ON REMAINDER	N	T	P(2-T)
Detailed	34.8	29.1	11	13	0.10>p>0.05
Highly coloured	35.0	29.2	7	10	>0.10
Unrecognisable	30.5	28.9	32	243	>0.10
Bizarre	25.2	29.3	15	32	>0.10
Auditory	48.2	28.9	12	16	0.10>p>0.05
Kinaesthetic	19.4	29.3	8	18	>0.10
Fleeting	28.1	29.2	14	28	>0.10
Persistent	26.6	29.3	15	44	>0.10
Transformation	32.0	29.1	23	94	>0.10
Developed	21.2	29.3	9	10	>0.10
Viewpoint change	42.2	29.1	7	9	>0.10
Memory	29.2	29.2	27	176	>0.10
Unrelated	29.2	29.2	35	274	>0.10
Recurrent	33.8	28.9	32	226	>0.10
New detail	37.6	29.0	9	12	>0.10
Discrepancy	31.2	29.2	8	13	>0.10
View above	32.6	29.2	7	9	>0.10
Moving	30.6	29.2	7	9	>0.10

(ii) Of the ten imagery categories for which mentation occurred in enough trials for the Wilcoxon Test to be applied, there was none which showed a significant difference between the proportion of correspondence points allocated to the target on the basis of the mentation in each category and the remainder in each subject's first of the two trials, although scoring was higher on the basis of all but one of the categories (memory-related) of mentation examined than of remaining mentation. The results for those ten categories are summarised in the table below:

Percentage of points allocated to target on percipients' first trials

MENTATION CATEGORY	% PTS ON CATEGORY	% PTS ON REMAINDER	N	T	P(2-T)
Unrecognisable	32.7	23.6	14	29	>0.10
Bizarre	29.1	24.9	7	9	>0.10
Auditory	52.8	24.7	9	12	>0.10
Fleeting	35.1	24.8	6	7	>0.10
Persistent	33.8	24.9	8	16	>0.10
Transformation	33.6	24.8	11	27	>0.10
Developed	26.3	25.3	6	7	>0.10
Memory	22.3	25.4	14	51	>0.10
Unrelated	29.1	18.1	18	65	>0.10
Recurrent	31.2	24.6	16	57	>0.10

Because scoring on the basis of none of the mentation categories was significantly better than on the remainder, a planned analysis was not carried out in which weightings calculated from the success rate of any mentation categories which had yielded significant scoring on the first trials would have been applied to the scores in the same categories in the second trials, to test whether feedback concerning those mentation categories which had been successful in the first trials could have improved performance in the second.

5.3.4. Scoring on Strong versus Weak Correspondences

(i) No significant difference in scoring was found when all the trials were re-ranked on the basis of strong correspondence point sums (using only item-by-item points of 3 or more to calculate the sum) and on the basis of weak correspondence point sums (using points of 2 or less), using Solfvin et al's (1978) sum-of-ranks analysis. Sums of ranks of 84.0 and 80.0 were obtained for "strong" and "weak" ranks respectively.

5.3.5. Confidence Calls

(i) Three different types of confidence call could be made on each trial. The first was based on the nature of the mentation; the second on

the degree to which one picture stood out above the rest in terms of its overall correspondence to the mentation; and the third on the occurrence of very good matches of individual mentation items to one picture. Confidence calls of the first and third types were not based on strict formal criteria, but the second involved the pre-planned selection of those nine trials with the highest Z-scores calculated for the first-ranked picture (using the sum of item-by-item correspondence points for each picture in the Z-score calculation). Such Z-scores reflect the degree to which the first-ranked picture stands out above the rest in correspondence to the mentation. The distribution of target ranks on the trials receiving the three different types of confidence call are shown in the tables below.

I. Transcript-Type Confidence Calls

	TARGET RANK			
	1	2	3	4
FREQUENCY	6	5	7	3

II. High Z-Score Confidence Calls

	TARGET RANK			
	1	2	3	4
FREQUENCY	4	3	0	2

III. Spectacular Match Confidence Calls

	TARGET RANK			
	1	2	3	4
FREQUENCY	3	2	0	1

For the transcript-based confidence calls, the mean target rank was 2.33, which is closer to the mean chance expectation of 2.5 than the mean target rank on the remaining trials of 2.00. However, both the high Z-score confidence calls and confidence calls based on spectacular matches

improved upon the remaining trials, with mean target ranks of 1.67 and 1.50 respectively, although neither differed significantly from the mean ranks on the remaining trials (mean rank 2.25, 35df, t=0.59 and mean rank 2.26, 35df, t=0.87, $p>0.10$ in both cases). Athough it might have been expected that those trials with individual good matches to one picture would also have been those in which overall one picture stood out above the rest, only 3 trials out of 12 which received either or both types of confidence call received both.

(ii) Only one trial received all three confidence calls; on this trial the target was ranked first. Clearly, the number of trials involved was too small for a meaningful comparison to chance.

(iii) There was no significant difference according to a t-test on the mean rank assigned to the target in scoring between trials receiving confidence calls based on high Z-scores and those receiving confidence calls based on good individual matches (t=0.268, 13df, $p>0.10$).

5.3.6. Identification of Displacement

(i) The distribution of target ranks on those trials on which displacement was judged (before feedback) to have occurred is shown in the table below. Ideally, an analysis for displacement, rather than psi-missing, would have been performed in which for each trial, the correspondence of the mentation to two target sets, one being the original and one being a randomly-chosen control set, would have been judged, as in Experiment One. Evidence of displacement would have been suggested if the scores on the control pictures in the original target set had been larger than the scores on the pictures in the control set (Child and Levi, 1980). Unfortunately, restrictions on the time available for judging precluded the use of such a procedure.

	TARGET RANK			
	1	2	3	4
FREQUENCY	3	1	6	2

The mean target rank of 2.58 is slightly below chance, although not significantly different from the above-chance scoring on the remaining trials for which the mean target rank was 2.00 ($t=1.53$, 35df, $0.10>p(\text{one-tailed})>0.05$).

5.3.7. Bias Due to Picture Liking

(i) A value of Kendall's Tau was calculated for the strength of the relationship between the independent judge's liking and correspondence ranks for each trial, and the number of positive and negative tau values obtained, which were compared using the binomial test. No significant tendency for the two to be related emerged; 19 Tau values were positive, indicating a tendency of liking and correspondence ranks to go together, and 12 Tau values were negative, indicating a tendency for liking and correspondence ranks to be opposed. A further analysis had been planned to compare mean target ranks on those trials on which correspondence ranks and liking ranks had tended to align, and those on which they had tended to misalign, in order to examine for a response-bias effect. This analysis was abandoned, however, since it was noted during the experiment that since the judge had already read the mentation transcript before ranking the target set pictures according to liking, her judgement of liking could have been affected by the correspondence of each picture to the mentation report, and that since the correspondence of each picture to the mentation could itself be an indicator of success on each trial, any relationship between scoring and the alignment of correspondence and liking ranks would not have been a true indicator of response-bias effects.

5.4. Discussion

Overall, scoring was non-significantly above chance, with a mean target rank of 2.2, as compared to a mean chance expectation of 2.5. This lack of significance may have indicated that there was no evidence of psi operating in this experiment, or that there was only a small amount of psi which was insufficient to result in significant overall scoring.

None of the different types of correspondence yielded scoring significantly different from scoring on the remainder, and scoring on the basis of formal correspondences was slightly, but non-significantly superior to that on literal correspondences. Apart from the possibility that there was no psi in this experiment, part of the lack of significant differences in scoring on the correspondence types could be due to the possibility that the judge tended to assign correspondence points on all types of correspondence to a picture once strong correspondences of one particular kind to that picture had been noted; the judge was aware of a temptation to look harder for correspondences in a particular picture once several items had corresponded well to it, and despite her efforts to be impartial, it seems unlikely that her judging would have remained completely unaffected. A procedure which would be free of this problem, and of the problem of differential sensitivity to the different types of correspondence discussed in the introduction to this chapter, is difficult to suggest at present, although both problems might be minimised by having a different judge each looking for one kind of correspondence, in which case the correspondence ratings for each kind of correspondence would be expected to be less interdependent; however, even with such a procedure, judges might still be influenced by other kinds of correspondence than the one with which they were concerned, despite their instructions. Despite these problems, there still may be value in pursuing this line of research, because if consistent

differences do emerge across large numbers of independent judges, these differences could be used to practical advantage, as discussed in the introduction, even if they were not valid reflections of some underlying process of paranormal cognition.

Formally developed but unrecognisable imagery was very slightly, and non-significantly more formally accurate than other imagery. Again, if this lack of a significant difference was not due to a lack of psi in the experiment or to the problem of interdependency discussed above, a possible contributory reason for the lack of a difference may have been that a fairly lax criterion for designating a mentation item as 'unrecognisable' was used; a mentation item such as "something that looks like a chimney-pot" was counted as an unrecognisable item, since the phraseology seemed to indicate that although the image somewhat resembled a chimney-pot, this was only the best possible description of an otherwise indescribable image, but this may not have been the case. In future, the use of a more stringent criterion, such as the use of only descriptive terms not relating to particular objects, should perhaps be used in defining the category of 'unrecognisable' mentation.

A second problem which may have related both to the above analysis and to the uniform lack of significant differences between scoring on the basis of various mentation categories and remaining mentation, was that the independent judge was only able to categorise mentations according to the percipients' verbal descriptions of their imagery, which may not have been sufficiently full for appropriate categorisation. For example, unless a percipient explicitly stated that an image was fleeting, the judge did not categorise it as such, and so a number of images may have been categorised wrongly. Another problem with having only the percipients' verbal reports of their imagery, which could have led to

spurious differences in scoring when two different types of imagery were in fact equally target-related, could have been that percipients might, for example, have described bizarre imagery very fully, since it was interesting or because the percipient thought it more likely to be target-related, while giving only cursory descriptions of more mundane imagery. Even if both kinds of imagery contained equal amounts of target-related information, the percipient's description of the bizarre imagery would contain more target-related information available to the independent judge, and bizarre imagery would thus appear more accurate than other imagery, according to the independent judge's data. A way of avoiding this problem, while still retaining the benefits of an independent judge's skill and experience, would be to use experienced judges as percipients, or to give percipients thorough training in judging before an experiment began.

No significant difference was found between scoring on the basis of strong correspondence ratings only and of weak correspondence ratings only. Again, the lack of difference could have been due to an absence of ESP in the study, or to the absence of any real difference between the two rating levels. Another possibility, however, could have been that, as for the different types of correspondence, the judge may have been able to allocate different numbers of points on a strictly objective basis; if, for example, a number of strong correspondences seemed to indicate that a particular picture was the target, the judge may have looked harder for even very weak correspondences in the picture, and allocated a large number of low correspondence ratings to the picture simply on the basis that the picture had received some strong correspondence ratings. One way around this problem might be to have one judge identify those mentation items which corresponded closely to any of the pictures in the set, and provide one group of judges with a transcript of these mentation items, and another

group of judges with a transcript of the remaining items, and compare performance on the basis of data from the two groups.

Confidence calls made by the judge for each trial on the basis of the kind of imagery experienced by the percipient failed to identify high-scoring trials, a failure consistent with the lack of significant scoring on any of the specific mentation categories examined. Again, this lack of effect could have been due to a lack of psi or to the percipients' descriptions of their imagery not being sufficiently full for the independent judge to categorise the transcripts appropriately.

Although confidence calls based on spectacular matches between individual mentation items and a single picture, and on high Z-scores of overall correspondence ratings both resulted in scoring higher than on the remaining trials (for which scoring was slightly above chance), neither difference was significant, a result which may have partly been due to the small number of trials for which confidence calls were made in each case (6 and 9, respectively); the apparent strength of the effect suggests that further research in this area might be rewarding. Apropos the finding in the previous experiment that the occurrence of individual good matches to one picture seemed to be a better indicator of success than a high Z-score, it is interesting that there was no significant difference between scores on these two confidence calls, even although only three trials out of the twelve which received either or both type of call received both; however, scoring on the 'spectacular match' confidence calls was slightly higher than on the high Z-score confidence calls, and it may have been that a large number of trials would have brought out a significant difference.

Also interesting was an indication that displacement may have occurred on those trials on which strong correspondences occurred to two or more pictures in the target set; scoring was lower

(0.10>p(one-tailed)>0.05) on those trials on which the judge suspected that displacement had occurred than on the remaining trials, with slightly below-chance scoring on the 'displacement' trials, as would be expected if displacement was not accompanied by some target-related scoring. If this result really was an indication that displacement occurred on these trials, rather than a weak statistical fluctuation, the apparent effect size again is quite strong and further research may prove useful. It should be borne in mind, however, that even a significant result would not have meant that displacement only occurs with displacement to two or more pictures in the target set, with no scoring on the target; it is quite possible that displacement could also occur to one single control picture, or to several pictures and include correspondences to the target (indeed, the latter possibility could have contributed to the lack of significance in this study, since only the degree of psi-missing, and not of the mentation's correspondence to control pictures, was used as an indicator of displacement).

Finally, there was no indication that the judge's correspondence and liking ranks tended to align, although the same finding might not hold for other independent judges who were unaware of the hypothesis being tested. A planned analysis, to examine for a response-bias effect by comparing scoring on those trials for which the two types of ranks were aligned with scoring on those trials for which the ranks were misaligned, was abandoned because of the probable contribution of the degree of the mentation's correspondence to each picture to the liking ranks assigned by the judge; since no bias appeared to be present, such an analysis would not have been expected to be successful, even without this problem. A procedure more appropriate to the examination of this question would be to have had a second person make transcriptions of the percipients' mentation,

so that the independent judge could have ranked the pictures for liking without already being familiar with the mentation for the trial.

Although all the analyses were uniformly unsuccessful in yielding significant effects, this failure may have been due either to the low or non-existent level of ESP functioning in the study combined, in the former instance, with a relatively small number of trials, and the possible contributions of the procedural problems discussed above.

CHAPTER 6

SUMMARY AND DISCUSSION

Taken as a whole, the experimental work conducted for this thesis cannot be said to have yielded significant evidence for ESP. Although a number of analyses yielded statistically significant results, these results should be considered in the context of the large number of analyses carried out, which by chance would be expected to give rise to a number of spuriously significant findings. However, the lack of spectacular findings in large numbers may have been due to reasons other than the non-existence of ESP in general or in these studies in particular; a number of procedural problems which may have contributed to the obscuring of any real effects in certain areas of investigation became apparent and were discussed along with suggestions for improvements in procedure which could be incorportated in future research. In some areas, apparent effect sizes seemed to be quite strong, but may have required a larger number of trials to allow them to reach significance; because of constraints upon the author's time and resources, it was not possible to conduct larger studies, but with some approximate indication of the effect size to be expected, future studies could be designed with a sufficient number of trials for the effects, if real, to be manifest.

Both of these factors have already been discussed in detail in the preceding chapters, in relation to the analyses to which they apply, and little purpose would be served by repeating them here. However, it would be useful to very briefly review the findings concerning the main topics of interest in the thesis, namely, the role of the agent; performance on specific mentation categories; the effects on correspondence judgement of picture preference; the application of information theory to ESP; and displacement.

6.1. Role of the Agent

The first two experiments in the thesis set out to examine some aspects of the agent's role which have received little or no previous experimental attention. In the first study, no real support was found for the hypothesis that scoring with an agent concentrating on a target would be higher than scoring without an agent, and only very indirect support for the hypothesis that the occurrence of displacement would be likely if the target set control pictures, as well as the target picture, were in the agent's presence during the trial. The results of Experiment Two were scarcely more revealing, although in support of earlier findings (Harley and Good, 1981; Sargent, Milton, Payne and Bennet, 1982), more percipients who noted a difference in the amount of unstructured and irrational mentation in the two halves in the ganzfeld experienced more of this kind of imagery during the half when the agent's activity was less structured; although this result was not significant (p(one-tailed)=0.073), the fact that the result approaches significance with a sample size of only twelve may suggest that the effect, if real, is quite strong, and may be worth following up. However, percipients showed no tendency to experience imagery in the particular modalities used by the agent during the "Experiencing" condition, nor to experience imagery more varied in modality during this condition. Although in both Experiments One and Two, significant correlations between scoring and agent psychological measures were obtained, these results could easily have been due to overanalysis in both studies; little weight should be attached to these findings without replication.

6.2. Mentation Categories

Significant findings concerning scoring on the basis of certain mentation categories were similarly thin on the ground, with only two

significant results (significantly high scoring on the basis of surprising imagery in Experiment One ($p(\text{one-tailed}) < 0.025$), and significant below-chance scoring on the basis of fleeting imagery in Experiment Two ($p(\text{two-tailed}) < 0.02$) for one of the judges) out of some thirty-five analyses. As discussed earlier, a possibly more powerful procedure for exploring this area may be to use percipients who are also experienced judges of mentation; further examination of this topic would seem worthwhile, especially since the assumption that percipients can detect psi-related mentation lies at the heart of most attempts at ESP training by means of immediate feedback; in such research, percipients are given trial-by-trial feedback of success and failure, and are presumably expected not only to remember subtle aspects of subjective experience, but also to remember them in relation to a running calculation of the probability that psi was operating on trials marked by such aspects; it would seem that training research could benefit greatly from the type of investigation carried out in the present thesis, where little strain is placed on the percipients memory, and all the hard work is done by the experimenter with a calculator.

6.3. Picture Preference

There was no indication that the percipients' attitudes towards the pictures in the set might determine to which pictures in the set they might displace in Experiment One, but since there was no convincing evidence of any displacement in the study, the hypotheses cannot be regarded as having had a fair test. More interesting was a post-hoc result in Experiment One, that percipients' correspondence judgements seemed to be heavily influenced by their liking for the pictures ($p(\text{one-tailed}) < 0.0002$). However, a planned investigation of this finding in Experiment Two showed that while a significant, although much weaker tendency for liking and

correspondence rankings to be aligned was, unlike Experiment One, shared by the independent judges in the study. This raised, among several possibilities, the suggestion that the judges had been influenced by a pattern of preference similar to that of the percipients; in Experiment Three, in which the author acted as an independent judge, no relation was found between her liking and correspondence rankings, although, since she was not blind to the hypothesis concerning the relationship between the two, the absence of a relationship in Experiment Three should not be construed as a demonstration that independent judges are not in general swayed by their preferences. Improvements in design and procedure were suggested which would yield more clearly interpretable results in this area, which merits further investigation because of the practical consequences of the existence of a strong bias in making correspondence judgements; if a strong bias towards assigning correspondence points exists which is random with respect to the identity of the target, then ESP performance, being relatively weak, will tend to revert to chance. Post-hoc analyses in Experiments One and Two to examine whether, as Sondow, Braud and Barker (1982) suggested, liking for pictures may relate to the probability that a given picture is the target, yielded no support for this suggestion, with the liking ranks assigned to the target being no higher than the correspondence ranks assigned to the target; however, a null result in studies with no strong overall evidence of ESP functioning cannot be considered a fair test of such a hypothesis, and further research is recommended.

6.4. Information Theory

While there was little indication that the occurrence of a high Z-score based on the highest-rated picture on a trial was associated with

success in Experiment Two, the pre-planned selection of those nine out of the thirty-seven trials in Experiment Three with the highest Z-scores resulted in higher scoring, although not significantly so, than on the remaining trials, and the large effect size suggested that further research in this area might prove rewarding. However, an interesting possibility which arose from a consideration of the independent judges' apparent ability to select highly-scoring trials on the basis of a a strong correspondence between mentation and a single picture in the target set, while high Z-scores did not seem to serve as indicators of high-scoring trials, was the suggestion that the Z-score might be a relatively insensitive indicator of high-scoring trials. Future exploration of a measure which reflects not only the extent to which a picture stands out above the others. in the set, but also the extent to which it stands out above its nearest rival, would seem to be indicated.

6.5. Displacement

The review of literature concerning displacement has already been fully discussed in Chapter Two; put briefly, the most useful information to emerge from the review was that displacement seems to be by no means the established phenomenon it is assumed to be in the literature, but that the failings of previous research to yield clear-cut findings nevertheless point very clearly to a concrete research strategy which should give displacement its best chance to prove itself.

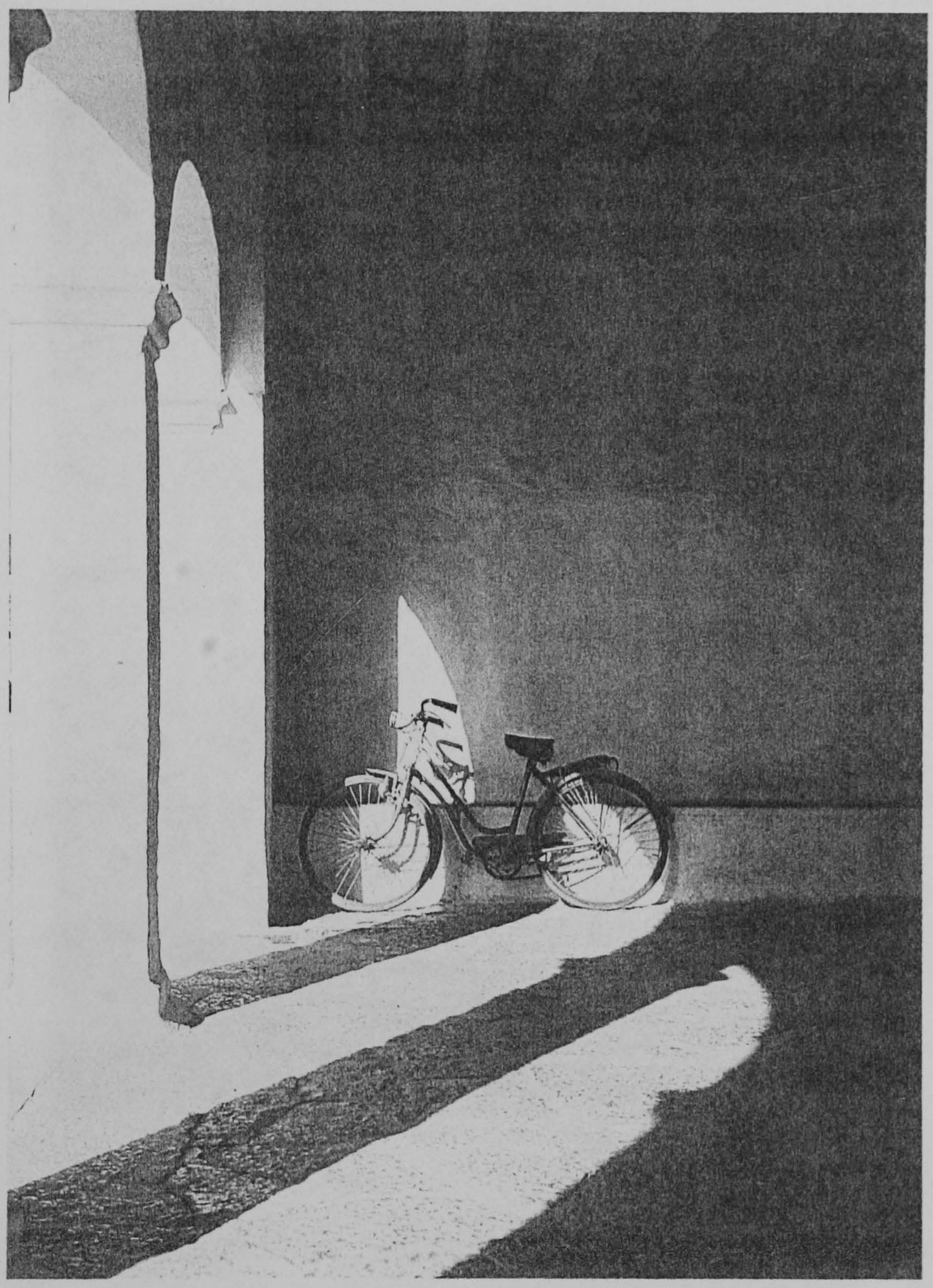
Among the most interesting findings to emerge from the experimental chapters was a marginally non-significant ($0.01 > p(\text{one-tailed}) > 0.05$) finding in Experiment Three, following an informal observation from Experiment Two, that some trials on which displacement occurs may be characterised by strong correspondences of the mentation

to a number of pictures in the target set; if a genuine effect, this finding could serve as a basis for identifying trials on which displacement has occurred before feedback, allowing the possibility for improving performance by ignoring the outcome of those trials on which displacement has been predicted to occur. In addition, the isolation of a specific group of individual trials on which displacement has occurred would facilitate exploration of psychological and situational factors related to the occurrence of displacement, since the contrast of the two populations of trials would be more effective than analyses applied to both kinds of trials mixed in together.

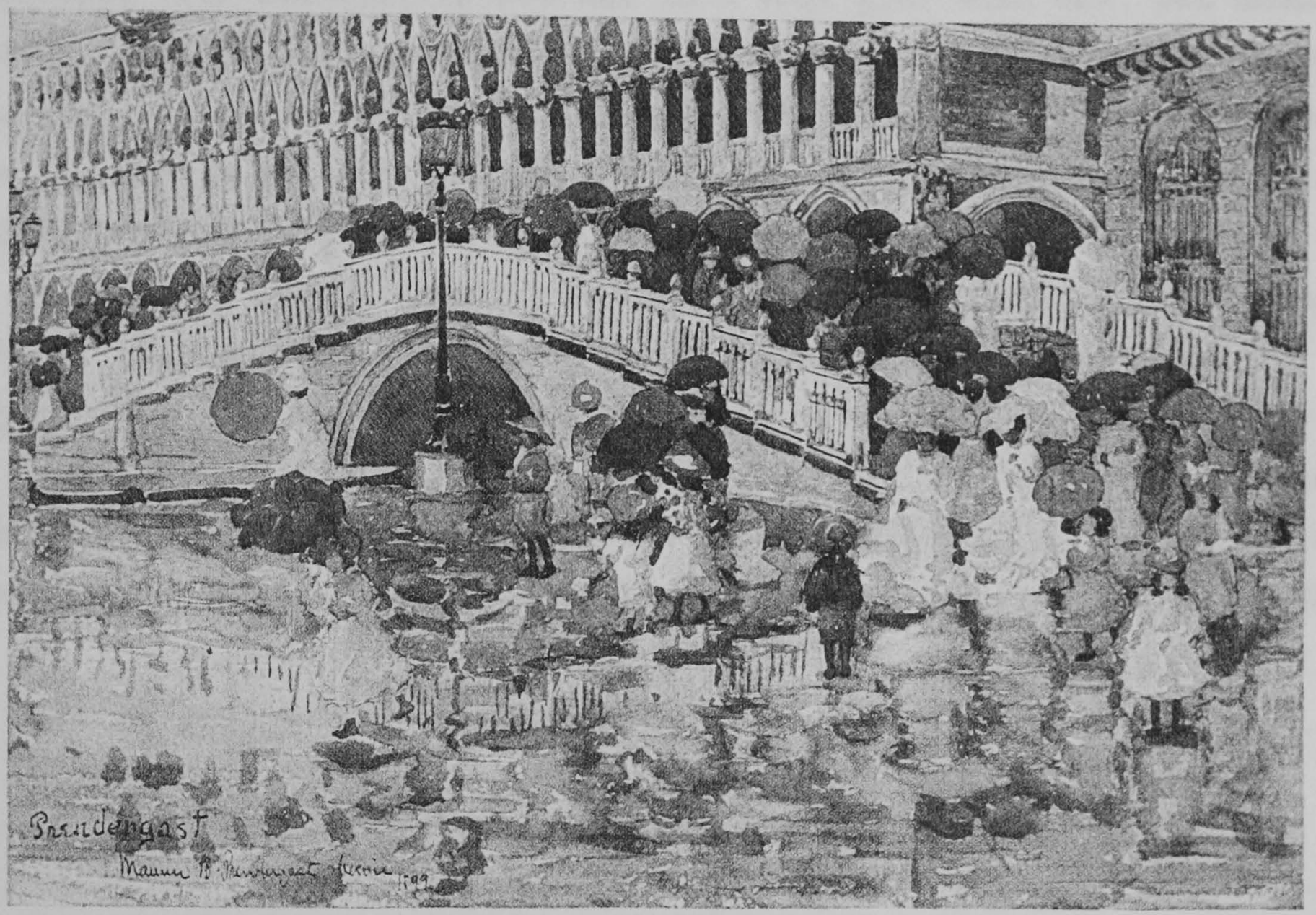
It is also interesting that in a study of only thirty-seven trials, with a trend of above-chance scoring, such strong apparent evidence of displacement resulted from a consideration of the twelve trials for which displacement was suspected; it may be that displacement is more prevalent than has been thought, but remains undetected in most free-response studies because analyses applied to all of the trials in the experiment are too crude to allow detection of displacement. However, until replication at an acceptable level of significance of this finding has been made, this remains as speculation.

I. APPENDIX 1: EXAMPLE OF TARGET SET

Reproduced in black and white on the following pages are four pictures used as a target set in the first two experiments reported in the thesis.




H. Daumier


Brandegast

II. APPENDIX 2: EXPERIMENT ONE AGENT QUESTIONNAIRES

Please answer the questions below by placing a stroke on the line between the two extreme responses given for each question to represent your own experience. For example, if you are in a very good mood now, you should place a stroke near the left-hand end of the line in question one; if in a very bad mood, near the right-hand end; if your mood is between these two extremes, place the stroke on that part of the line where your experience falls along the continuum between the two extreme responses.

Do not fill in the questionnaire until you have completed the sending period of half an hour. On one of your three trials as agent, the questionnaire will not be appropriate; it will be obvious which trial that is when it happens. On that trial, don't bother to fill in the questionnaire. Whether you complete the questionnaire or not, place it in the envelope with the condition instructions, seal the envelope and sign it over the seal.

(1) What is your mood like right now?

Very good _____ Very bad

(2) How motivated did you feel, on average during the sending period, to do well on this trial?

Not at all motivated _____ Highly motivated

(3) How interested in your task did you feel during the sending period?

Very interested _____ Very bored

(4) For what percentage of the period during which you tried to concentrate on the target did you feel able to concentrate properly on it?

0% _____ 100%

III. APPENDIX 3: EXPERIMENT ONE MENTATION TRANSCRIPTS

Below are reproduced three examples of percipients' ganzfeld mentation transcripts, all differing somewhat in style and content. Transcript A is a fairly mundane list of items, many of which are associations to the previous items; Transcript B consists of more bizarre and unusual imagery, with items of mentation which tend to be unrelated to one another; and Transcript C is an account of mentation closely resembling a guided imagery tour, with a large component of bizarre and unusual imagery linked by the traveller's route. The divisions made by the percipients between individual mentation items are marked by a stroke.

TRANSCRIPT A

Sports car driving along a beach./ A brickworks./ The geography department./ C's swimmingpool./ Donny Osmond./ The Usher Hall./ The new car park,/ derelict land./ The Forth roadbridge./ S on her horse on the beach./ A's kitten./ A's horse./ Arthur's Seat./ The fruit shop./ Maths books./ The flat./ The Castle./ Flag flying on a turret./ A moat around it./ Potentillas (yellow flowers)./ View across the Forth from top of steps./ Blue sky./ White clouds,/ seagulls,/ a white horse hill,/ Salisbury Hill and Stonehenge./ Buried treasure./ Burial chambers./ Winchester,/ Salisbury Cathedral,/ Winchester Youth Hostel which is a watermill./ Fish in a stream./Fairy tale where the boys go to fetch the moon./ The television globe./ Listen With Mother programmes./ Andy Pandy./ The white rat on a boat./ Morris dancers/ Cathy./ Forest of Dean, Simmond's Yat./ Clogs and jingling bells./ National library./ A straight road./ Corbusier tower blocks./ Plumtrees and orchards./ Razor shells./ Marram grass and sand./ Cooking potatoes and broccoli./ A cannon on a gun hill./ Seaside,/ sandcastles,/ beach-huts, deckchairs,/

Sailingboats./ Saltmarshes, tidal river./ Shrimps,/ ducks and gorse./ Sandshoes./ Basketshop./ Bikes, the common,/ the butcher's shop./ A flower festival, thatched church roof./ Dunwich,/ the donkeys./ Sizewell power station./ The sluice, marshes./ The Eel Inn,/ Eastbridge, fishing./ The church./ Village pond,/ undertaker's hut./ Buttered toast,/ crumpets,/ Kew Gardens,/ raining./ Cricket on Richmond Green./ The swings,/ Richmond pub,/ pet shop by the station./ London clinic./ Regents Park./ Circular plan of the park./ Chessington Zoo./ Crows./ Blackberries,/ Manobier Castle./ Damp air./ Queen's cottage at Kew./ Raining./ Covent Garden,/ the Royal Wedding./ Rubbish all over the street./ Colourful flags./ Stripey deckchairs./ Birdcage Walk,/ Houses of Parliament,/ Westminster Cathedral./ Stripey stonework./ Sissinghurst Castle./ Flag on the tower./ Dover Castle./ Changing of the guard,/ soldierbox./ Feeding the ducks./ Strings of pebbles hanging on the cottage./ Aquilaqueas, a purple plant./ The cottage at Bonally./ A man dressed up as a hermit./ Bonally Tower./ Turrets./ END

TRANSCRIPT B

Streaks of light like arrow going from left to right./ Geometric patterns./ Distinct horizon, open space. Could be the division between sky and earth or sea and sand./ Sailing boat seen from the side with sail blown out./ Boat has changed into camera from the front./ Geometric shapes again. Feel like I'm falling backwards very quickly./ Humpbacked bridge from the side, cyclists going over. I'm on road standing at nearside, bridge at a three-quarters angle./ A cyclist stationary on it./ Fields on the far side. A crossing, open sea again, row of houses, little cottages, soft colours./ The number four flashing./ Coastline seen from plane at low altitude coming down, very crowded, Mediterranean./ Camel or horses. Fully-laden, massive

things on it, being ridden, a camel./ An ornate figure, Turkish figure in the Fry's Turkish Delight advert wearing full robes and a kaffir, on his left he's got a long curved dagger./ Straight ahead is a red horizon./ I'm looking into water from above, vague blurred outlines,/ frogs, it's all blurry, moving to a centrepoint, like a mist, images appear and disappear./ A human head, weird, keeps changing. Distorted faces./ Tools like things you pull nails out with, clamp things./ City scene... huge skyscrapers, Manhattan Fifth Avenue, very busy but people not moving. I can't turn at will in any direction. Figures riding, mounted police force, traffic./ Now looking down on it. It's quite sharp. Traffic lights and pedestrian signals, an American "walk, don't walk" thing, yellow./ Very fat woman laden with parcels, dropped them... crossing the road and she's walking into a tunnel. Back on the street, very busy scene./ Bulldozer digging up the side of the road, the building dilapidated, roof caved in, holes in walls, smashed window, it's now a heap of rubble, between two larger buildings - it was part of the same building. Concrete apartment blocks with laundry in windows at the back,/ now a prison with cell bars instead of laundry./ Changes into a waterfall, I can hear it, very loud rumble. Sound is quite strong./ I'm on top looking over edge, mist at bottom, swirling. River forks off to right, narrows further down in valley./ Sides of valley now walls of huge palace room, cliche picture of a monarch seated at one end with loyal subjects either side, but modern dress, tie and tails, ballgowns, Christmas-tree jewellry. Very reddish colours, to the right tables, very long, but it's not a dining room. Go down three or four steps to the tables./ Exhibit of sorts on the tables, not food. All gazes towards me at the door at the other end of the room, as though expecting something./ Cat ran down the aisle towards and past me./ Area changes into an Arabic living room in the old style, carpets everywhere, huge smoking gong, people seated. It's in a huge tent or loose tapestries are

hung to take away the square aspect of the room, coming away from the walls and up to the ceiling to form concave roof. Cushions./ Something wrapped in material to the left as you come in, a body or something bigger. Cosy place./ Looking at shadow of a skull, fills the whole field of vision, which has darkened./ Very bright green flashes. Idea of a focal point in the middle with two sharp inclinations or movement to a centre point. Falling from top extremeties to bottom centre in two arcs, not a straight line. Double arc./ Hot air balloon, very old... basket area is square... looks like the basket was made in somebody's attic. Bright lights./ A rabbit, running from right to left through thick bushes, dense vegetation. Stops abruptly, afraid of a boy maybe. Everything associated with movement. Scuttles away straight up the field of vision./ Hotel corridor, ramp going up at the end. People moving past,/ two motorbikes,/ light is bright like an operating theatre./ Keep seeing animals in motion, jaguar, lion, in no setting or background. Crab, one of its claws broken as if amputated./ Roulette table, wheel is very large. Intense concentration on the wheel, not spun yet, people laying bets, croupier laying chips with fork. Wheel has four bits coming out of it./ END

TRANSCRIPT C

Sitting on the minute hand of a large clock. It's draughty. Chiming, clock vibrates, noise is loud./ Stops, I lean back against enamelled clock face./ Slide off large hand and swing hanging off minute hand./ Drop down to twenty feet below to the ground./ Walk past lake with Canada geese on the left hand side and walk round lake chucking bread./ Walk into woods on left hand side. Quiet and peaceful, sound of dove./ Smartly dressed man in suit and blue tie walks past, says nothing./ Take right hand fork in path.

Trees either side, silent there now. Trees are pines./ Turn left, following path. Swings where children playing cheerfully on left. Walk past./ Turn somersault in mid air, and another... curious./ Path meets road, turn right along road. Fields either side, hedgerows, traffic going fast, carbon monoxide and sulphide smell. Plane overhead, quite large, recedes,/ leaving peaceful flat countryside. Sit on bench at side of road./ Eat apple. Chuck core behind me./ Squirrel pops out in front eating fircone, goes./ Keep walking, no traffic, sun setting, chilly. Come to a town./ Climb on top of a cottage and sit on roof./ Woman hanging laundry in garden, a maid./ Changes into a fencing match, fast and furious. I lunge and catch him on the chest, score a point./ We shake hands, I go and sit at side of area,/ jump across seats and fall./ Walk out, down steps outside in modern street./ Shops, go in and have coffee, read a book, enjoying it./ Riding a horse, long pasture, gradually gallop, exhilarating air, country./ Slow down, horse is puffed. Walk gently back to stables./ Leave stables, cross road./ Walk across fields, heavy going, muddy./ Face appears, fifty to sixty feet high, transparent. Can see hills through the face./ Solemn, not stone... more like a painted mask./ I walk through the mouth, look back, still there, it just sits there./ Cross ditch into next field./ Few cows in it which ignore me and keep grazing. I ignore them. Few calves among the cows./ Walk up to farmhouse, buy milk from woman who answers door and drink it./ Hot day, smell of hay, manure, farmyard./ Pass farmer with leathery complexion, sheepdog following him./ Take chalky path to the coast./ Sea stretches for miles, no ships, very calm./ Feel sleepy, sit on stone to rest./ Have glass of red wine, glass from pocket, bottle hanging around neck./ Walk along coastal path, cliffs white and chalky beneath. Hot, no breeze./ Climb down cliff to small rocky ledge, jump off and swim./ Refreshing, water is cool and calm, not too salty./ Tread water, hop out/ and put clothes back on./ Walk

inland, past two cottages on the right, little church on the right./ Steep drop on the left, quarry./ People working in quarry, people hauling up baskets of chalk./ Scene of a couple of centuries ago. Men in old brown clothes, cheerful./ Walk past them into catage nearby./ Cool inside, fire in grate, old lady reading book by the fire./ We say "hello", she looks up./ I walk upstairs, have to push through a blue curtain./ Go into room which seems to be where I stay. Nice bedroom, large, clean, pleasant./ I sleep, wake again, wind is blowing leaves against the window. Autumn./ Go for walk taking thick coat./ Strange countryside, rocks strewn, some carved with idols./ I pick one up and look at it, it's exquisitely carved./ Lots of them on the grass, about three feet high./ I step on one and see they stretch on all sides like a plain of them./ Begin to walk out of it./ I come to a tree, an oak tree, on the edge of what must be a kind of cemetery./ A notice saying "Sundays only" on the tree., facing the wrong way./ Walk past, faced with large blank church wall made of stone. Grass between me and it, and a path, parallel to the wall, which has a flint path in front of it./ Touch wall, rough feeling, warm stones./ Walk past wall, come to village church./ Cool inside, solitary figure praying, dressed in black./ He leaves./ Very old church, very few modern trappings, mostly bare stone, wooden pews./ Walk out,/ friar in porch of church wishes me good afternoon in French, his own language./ Buy bread in a shop./ Telephone on black counter, old-fashioned with no dial./ Old fellow asking operator for something./ Ask if there's bed and breakfast, they say "yes",/ walk up spiral staircase, into bedroom, same as before./ Lot of books on walls, shelf on one side of room./ Hear tea-gong,/ go downstairs to tea-room, lots of other guests, a dozen./ I greet them and sit down. It's a merry party,/ chink of china, quite young people chattering./ I feel queasy and drink some tea./ Thunderstorm, hail against the window./ Man outside rushes for shelter towards the house, gets soaked before he

gets here./ Comes in, still wet with coat and hat on./ Fills a vacant place which I hadn't noticed./ Takes his coat off, chucks it on the floor, throws hat on top in disgust./ Says he's thirsty./ Coat of arms on the wall, three serpents intertwined./ Something in Greek written on it./ In English above it says "Peace under the serpents", must be a joke./ I go up to the bedroom,/ light a pipe and read./ END

IV. APPENDIX 4: EXPERIMENT ONE PICTURE ATTITUDE QUESTIONNAIRE

Indicate, by placing a tick in the appropriate place in the tables below, the responses which apply for you to each picture.

(1) How much do you like each picture?

	α	β	γ	δ
Dislike it very much				
Dislike it moderately				
Indifferent to it				
Like it moderately				
Like it very much				

(2) How interesting do you find each picture?

	α	β	γ	δ
Very interesting				
Moderately interesting				
Not very interesting				
Boring				

(3) How familiar are you with each picture?

	α	β	γ	δ
Never seen it before				
Recognise it, but it's not particularly familiar				
Very familiar with it				

(4) Do you feel that the pictures have any special significance for you?

	α	β	γ	δ
No significance at all				
Slight significance				
Moderate significance				
Great significance				

(5) Place the pictures in rank order on the basis of which you would rather look at for ten minutes, with the picture you would most like to look at ranked first, the next second, the next third and the picture you would least like to look at in fourth rank.

Picture	Rank
α	
β	
γ	
δ	

V. APPENDIX 5: EXPERIMENT ONE JUDGES' INSTRUCTIONS

Enclosed are twenty-two sets each of four pictures, and 35 mentation transcripts (transcript 10 has been left out). You should judge the correspondence between the transcripts and the sets indicated below, in the order given, i.e., starting with transcript 01, set 21, then transcript 01, set 15, then transcript 02, set 18, and so on down to transcript 36, set 14.

Data sheets are provided for the correspondence judging; subjects have divided their transcripts into items, separated from each other by a stroke (/). Thus, for transcript 01, item 1 is "Mountain, moon behind it."; item 2 is "Sailing boat, red sail, Viking ship but smaller." and so on. You should give a correspondence rating for each item judged against each picture in the appropriate set, using the scale below:

0 - No correspondence

1

2 - Slight correspondence

3

4 - Moderate correspondence

5

6 - Good correspondence

7

8 - Very good correspondence

9

10- Perfect correspondence

Correspondences may be literal, based on similarities of form, symbolic, thematic, emotional, and so on. When assigning ratings, you should consider the closeness of the correspondence (e.g., the correct response of 'glider' would get a higher rating than 'aeroplane'), the complexity of the picture (more items will correspond with a complex picture than with a simple one just by chance), and the frequency of occurence of the response item in ganzfeld mentation transcripts (e.g., the response 'waterfall' is very common and would get a lower rating than 'whirlpool' if correct).

Having given correspondence ratings for all the items in a transcript to a picture set, the points given to eacn picture should be totalled and used as a rough (but not binding) guide to place the pictures in rank order on the basis of their overall correspondence with the transcript, the picture matching best being ranked first, the worst fourth; ranks may not be tied. Then each picture should be given a rating of overall correspondence with the transcript, using the 0 - 10 scale; any number of pictures may be given the same rating if you wish.

VI. APPENDIX 6: EXPERIMENT TWO PERCIPIENT QUESTIONNAIRES

PRE-SESSION QUESTIONNAIRE FOR PERCIPIENTS

NAME.....

Just a few short questions. Please answer each question by placing a cross somewhere on the line shown. The nearer to one end of the line your cross is, the greater the emphasis on your reply.

1.How physically relaxed do you feel right now?
0=Very tense; 99=Very relaxed
2.What is your general mood like right now?
0=Very good; 99=Very bad
3.Do you think ESP is possible under the conditions of the experiment?
0=Very doubtful ESP will occur; 99=Completely certain ESP will occur
4.How motivated are you for success on the ESP session right now?
0=Strongly motivated; 99=Not at all motivated

POST-SESSION QUESTIONNAIRE FOR PERCIPIENTS

NAME.....

1. How physically relaxed do you feel right now?
0=Very tense; 99=Very relaxed
2. What is your general mood like right now?
0=Very good; 99=Very bad
3. How would you describe your feeling of success on the ESP session right now?
0=Very doubtful ESP occurred; 99=Completely certain ESP occurred
4. How would you describe the quality of your mental activity in the ganzfeld?
0=Structure, rational,directed; 99=Spontaneous, dreamlike, bizarre
5. How much effort did you exert in getting imagery in the ganzfeld?
0=None at all; 99=A great deal
6. How would you describe your attitude towards the ESP task during the ganzfeld?
0=Detached, gamelike; 99=Anxious to succeed
7. How pleasant was your experience in the ganzfeld?
0=Very unpleasant; 99=Very pleasant
8. For what proportion of the time you spent in the ganzfeld would you say you were thinking in a different way from how you think in your normal waking state?
0=0%; 99=100%
9. How long did the time spent in the ganzfeld seem to be?
Minutes.....

10. Please place a tick in the appropriate column according to when during the session you experienced most of the following kinds of thoughts (you may like to read through your transcript before answering this):

	First half most	Second half most	Equal in both halves	None of this content
(a) Vision	...	...	...	...
(b) Hearing	...	...	...	...
(c) Smell	...	...	...	...
(d) Taste	...	...	...	...
(e) Touch	...	...	...	...
(f) Motion	...	...	...	...
(g) Emotion (inc. humour)	...	...	...	...
(h) Sense of atmosphere	...	...	...	...
(i) Unstructured, dreamlike thought	...	...	...	...

11. In which half of the trial did you think the agent was trying to "experience" the target? Place a tick against the appropriate answer.
First half... Second half...

12. On what basis did you answer Question 11?

13. Is there anything concerning your experience in the ganzfeld that you felt was interesting or important that you'd like to add?

Thanks.

VII. APPENDIX 7: EXPERIMENT TWO AGENT QUESTIONNAIRES

Reproduced below are the instructions and questionnaires for the agent for a trial on which the "Hoping" condition came first.

QUESTIONNAIRE AND INSTRUCTIONS FOR AGENTS

Below is a timetable of what you should do; the times shown are minutes on your stopwatch. You have plenty of time to do everything, so just relax and enjoy yourself!

10 minutes: Open the envelope containing the target picture. Examine it for half a minute or so, and then put it back in the envelope and out of sight behind you. Until the stopwatch reads 23 minutes, just hope that your percipient succeeds on the trial. Don't pay any attention to the target picture or try to remember what was in it - just relax and think of your percipient succeeding.

23 minutes: Please answer the questions below by placing a cross on the line between the two extreme responses according to where your own response lies. There are no "correct" or "desirable" answers - just place your cross according to what describes you best.

1. How much did you enjoy the "strategy" used in this half of the trial?
0=Not at all; 99=Very much
2. How much of the time did you hope for success on the trial?
0=None of the time; 99=All of the time
3. How much of the time did you think of the content of the target picture?
0=None of the time; 99=All of the time
4. How much of the time did you think of the percipient?
0=None of the time; 99=All of the time
5. How motivated to do well on the ESP task do you feel right now?
0=Strongly motivated; 99=Not at all motivated
6. How would you describe your attitude to your part of the experiment in this half of the trial?
0=Detached, gamelike; 99=Anxious to succeed
7. How would you describe your attempts to do well in this half of the trial?
0=Conscious effort; 99=Mere intention
8. Do you think that ESP was possible using this strategy?
0=Yes; 99=No

25 minutes: Place the target picture on the table in front of you. For the next 15 minutes, try to experience the content of the target picture as realistically and in as many ways as possible in addition to the purely visual. Try to imagine yourself in the environment which the picture shows; if there are people in the picture, imagine yourself as one of them, especially any central characters. Imagine hearing what they would hear, feeling what they would feel (temperature, texture and weight of clothes, etc.), smelling what they would smell, tasting any food around them. Get up and imitate their movements and postures. As well as imagining the physical sensations, try to envelop yourself in the atmosphere (if any) that the picture tries to create, and to feel the emotions it depicts.

40 minutes: Please answer the questions below by placing a cross on the line between the two extreme responses according to where your own response lies.

[Note: With the exception of Questions 9 and 10 below, this questionnaire was identical to the one above.]

9. How realistically did you manage to enter into the target picture?
0=Not at all; 99=Completely

10. Please place a tick against the various ways in which you tried to experience the target picture.

(a) Vision .....
(b) Hearing .....
(c) Smell .....
(d) Taste .....
(e) Touch .....
(f) Motion .....
(g) Emotion, inc. humour.....
(h) Sense of atmosphere .....

Now please wait where you are until I come to fetch you, probably in less than half and hour's time from now.

VIII. APPENDIX 8: EXPERIMENT TWO JUDGES' INSTRUCTIONS AND QUESTIONNAIRE

Enclosed are twenty ganzfeld transcripts and twnety sets of four picures. You should judge the correspondence between each transcript and set pair in the order in which the transcripts are listed.

The transcripts have been printed in a format so as to be as easy to use as possible. Subjects have divided their transcripts into items, and each new item begins on a new line, marked with a star. Correspondence data columns are drawn in down the sides of the transcripts, so that all you have to do is fill in a correspondence rating for each item judges against each picture in the appropriate set, on a scale of 0 to 10 (0 indicating no correspondence, 10 being perfect correspondence).

Correspondences may be literal, based on similarities of form, symbolism, theme, emotion, and so on. For part of each trial, agents have been instructed as follows: "...try to imagine yourself in the environment which the picture shows; if there are people in the picture, imagine yourself as one of them, especially any central characters. Imagine hearing what they would near, feeling what they would feel (temperature, texture and weight of clothes, etc.), smelling what they would smell, tasting any food around them. Get up and imitate their movements and postures. As well as imagining the physical sensations, try to envelop yourself in the atmosphere (if any) that the picture tries to create, and to feel the emotions it depicts." Please take into account what an agent might have been doing for each picture.

When assigning ratings, you should consider the closeness of the correspondence (the closer the correspondence, the higher the rating), the complexity of the picture (more items will correspond with a complex picture than a simple one just by chance) and the frequency of occurence of the response item in ganzfeld mentation (for example, the response "waterfall" is very common and would get a lower rating than "wombat" if correct).

Please ignore whether the subject repeats an item, or states that it was particularly vivid or that he or she had it for breakfast; all of these categories will be analysed separately, so it is important that you judge them on the basis of their content only, rating each picture independently of the others.

Having given correspondence ratings for all the items in a transcript to picture set, the points given to each picture should be totalled and used as a rough (but not binding) guide to place the pictures in rank order on the basis of their overall correspondence with the transcript, the picture matching best

being ranked first, the worst fourth; ranks may not be tied. Then each picture should be given a rating of overall correspondence with the transcript, on a scale of 0 to 100; any number of pictures may be given the same rating if you wish. Data sheets for this are attached.

In addition to these correspondence measures, I'm also interested in whether or not you can tell which transcripts were successful in being related to the target, and on what grounds you are making such judgements. Attached is a data sheet for you to say whether you think each transcript was successful or not, and a space for you to say on what basis you made you judgement - please explain as fully as you can.

TRANSCRIPT	DO YOU THINK THE TRANSCRIPT WAS SUCCESSFUL IN BEING RELATED TO THE TARGET? (ANSWER 'YES' OR NO.)	ON WHAT BASIS DID YOU MAKE YOUR JUDGEMENT?
1		
2		
3		

IX. APPENDIX 9: EXPERIMENT THREE MENTATION CATEGORIES

(1) DETAILED - image is very clear in terms of form
(2) HIGHLY COLOURED
(3) UNRECOGNISABLE - features of the image can be described but the image is not a recognisable object or scene
(4) BIZARRE - the image contains an unusual combination of elements
(5) AUDITORY
(6) KINAESTHETIC
(7) EMOTIONAL
(8) VERBAL - e.g. "the word "parrot" just occurred to me..."
(9) FLEETING - a brief image which appears and disappears quickly
(10) PERSISTENT
(11) INTERRUPTS A CHAIN OF THOUGHT
(12) OUT OF CONTEXT - an element appears in an already present image and is out of context.
(13) RESULT OF A TRANSFORMATION - e.g. "...and now it's turned into a wolf's head..."
(14) DEVELOPED FROM AN UNRECOGNISABLE IMAGE
(15) VIEWPOINT CHANGES
(16) PERSONAL MEMORY
(17) UNRELATED TO THE PREVIOUS IMAGE
(18) RECURRENT
(19) GAINS IMPORTANCE - a detail of a pre-existing image becomes important
(20) NEW DETAIL DEVELOPS from a pre-existing image
(21) INCOMPLETE IMAGE
(22) TWO IMAGES ARE SUPERIMPOSED
(23) PERCIPIENT NOTES DISCREPANCY IN IMAGE
(24) PART OF THE IMAGE IS PARTICULARLY IMPORTANT
(25) THE IMAGE IS UNUSUALLY LARGE
(26) OBJECT OR SCENE IS VIEWED FROM ABOVE
(27) NORMALLY STATIONARY OBJECT IS MOVING

X. APPENDIX 10: PUBLICATIONS RELATING TO THIS THESIS

The following paper, which was a report on Experiment One, appeared in Research in Parapsychology 1983, R.A. White and R.S. Broughton (Eds.), Scarecrow Press: Metuchen, N.J., 1984.

THE EFFECT OF THE PRESENCE OF AN AGENT ON ESP PERFORMANCE AND OF THE ISOLATION OF THE TARGET FROM ITS CONTROLS ON DISPLACEMENT IN A GANZFELD CLAIRVOYANCE EXPERIMENT (RB)

Julie Milton (Edinburgh University)

Many cases of apparent displacement--the misdirection of a subject's ESP to some experimental material other than the target --are given in the free-response literature in the form of anecdotal cases on individual trials or post-hoc statistical analyses usually performed to investigate psi-missing. However, Child and Levi (JASPR, 1980, 171-181) give examples of remarkable correspondences between mentation transcripts and control pictures selected some time after the trials to be used by independent judges, quite as striking as those experimental cases put forward as evidence of displacement: Post-hoc analyses may simply reflect random fluctuations in correspondence between mentation reports and nontarget pictures in the target set.

Given the unreliability of the evidence concerning displacement, it was decided that a study manipulating variables which may lead to displacement, with displacement as a dependent variable, would be of value. A common theme of explanations proposed for displacement involves the agent as a beacon guiding the subject's ESP (Tyrrell, PSPR, 1947, 65-120; Stanford and Neylon, RIP 1974, 89-93; Rogo, Research Letter, 1979, 40-54).

The working hypothesis in this study was that the agent's attention guides the subject's ESP. Thus, better performance would be expected if an agent was with a target than if he was not; in addition, if the nontarget pictures in the target set were with the agent as well as the target, all pictures in the target set should be available to the subject's ESP, giving chance-level scoring overall due to a combination of equiprobable psi-hitting and displacement to controls.

To test this hypothesis, a within-subjects design was used in a Ganzfeld clairvoyance study with three conditions. In the first condition, an agent remained with the target isolated from the nontargets in its set during the Ganzfeld period; in the second condition, there was no agent and the isolated target was left in the agent's room; in the third condition, the agent remained with all four pictures in the target set.

Twelve subjects took part. Each subject had the same agent on all three trials, and with one exception, agents were all subjects in the study. Subjects knew that the experiment involved a clairvoyance procedure, but did not know the purpose of the experiment. On any trial, neither experimenter (J.M.) nor subject knew which condition was operating, and the agent did not know the outcome of the trials until the end of the experiment.

After setting the subject at ease in the laboratory, the experimenter took the agent to her office and returned to the laboratory. In three separate envelopes, the agent received instructions for the trial, the number of the target set, and the code identifying the target within the set. The condition, set, and target were predetermined by an independent randomizer using random digit tables. The target pool consisted of 22 sets of four pictures of at least moderate complexity. In the first condition, the agent took a sealed envelope containing the target picture to a room three floors below the laboratory and attempted to concentrate on it for the duration of the Ganzfeld period. In the second, the agent left the envelope containing the target in the room and left the building before the Ganzfeld period began. In the third, the agent took the entire target set to the room and attempted to concentrate on the target, with the other three pictures out of sight behind. The agent never saw any of the pictures, targets or controls; they always remained in the sealed envelopes. After each trial, the agent completed a questionnaire measuring mood, motivation, concentration, and boredom, and left the building.

Meanwhile, in the laboratory the subject relaxed on a reclining chair with halved ping-pong balls taped over his or her eyes, illuminated by a red desk lamp, wearing headphones over which he or she listened to a tape of pink noise. The experimenter, in an adjacent cubicle, noted down the subject's mentation. At the end of the 30-minute Ganzfeld session the experimenter retrieved from the office a duplicate judging set specified by the set number left by the agent. The subject completed a questionnaire concerning his or her preference for and familiarity with the pictures in the set, and then ranked and rated each picture on the basis of its correspondence to the mentation transcript. The experimenter retrieved the target from the agent's room and showed it to the subject.

In addition to the main predictions, the relationship between the subject's picture preferences and the agent's state and performance and displacement will be investigated.

A PSYCHOKINESIS EXPERIMENT WITH A RANDOM MECHANICAL CASCADE*

Roger D. Nelson, † Brenda J. Dunne, and Robert G. Jahn (Princeton Engineering Anomalies Research)

Introduction. The Random Mechanical Cascade (RMC)

*This work was supported in part by grants from The McDonnell Foundation (Psychophysical Research Laboratories), The John E. Fetzer Foundation, Inc., and the Ohrstrom Foundation.

The following paper, which was a report on Experiment Two, appeared in Research in Parapsychology 1984, R.A. White and J. Solfvin (Eds.), Scarecrow Press: Metuchen, N.J., 1985.

Part 1: Papers

FREE-RESPONSE GANZFELD STUDIES*

THE EFFECT OF AGENT STRATEGIES ON THE PERCIPIENT'S EXPERIENCE IN THE GANZFELD

Julie Milton (University of Edinburgh)

Studies concerning the role of the agent in ESP have tended to look for differences in magnitude of scoring due to manipulations of the agent's activity. This study was designed to examine how two different strategies employed by the agent might affect not only the quantity of ESP but also the quality of the percipient's experience in the Ganzfeld.

Twenty percipients with their agents took part in one trial each. Subjects, both male and female, were mostly students aged between 18 and 35. When the percipient and agent arrived at the laboratory for their trial, the experimenter (J.M. throughout) provided coffee and biscuits and the group chatted until the two participants were at ease and ready to begin. The experimenter escorted the agent to her office, where the target pool and target selection materials were kept, and gave the agent instructions concerning them. She started two stopwatches, gave one to the agent, and returned to the laboratory.

In the office, the agent opened sealed envelopes containing slips of paper bearing the target set number and target letter (identifying the target within the set) for that trial. The target pool contained 22 sets of four pictures. The sets and targets to be used were preselected by an independent randomizer (John Beloff) using a numerical code to translate random digits from a table into the appropriate target information. The agent removed the specified envelope containing the target picture, and leaving only the target set number behind, went to the agent's room across the corridor. On the desk in the agent's room was a sealed envelope containing instructions for what the agent should do during the Ganzfeld session, which began when the stopwatch read ten minutes. In one half of

*Chaired by Charles Honorton (Psychophysical Research Laboratories).

each trial, the agent tried to experience the scene in the target picture as realistically and in as many ways in addition to the purely visual as possible. In the other half of the trial, the agent concentrated on hoping that the percipient would succeed, while paying little attention to the content of the target picture. The order in which the agent used the two strategies was pseudorandomly counterbalanced, and the instructions were prepared by the independent randomizer. After each half of the trial, the agent completed a questionnaire on his or her psychological state, how he or she approached the strategy, and in which ways he or she tried to experience the target in the "experiencing" condition. When the trial was over, the agent remained in the room waiting for the experimenter.

When the experimenter returned to the laboratory, she asked the percipient to complete a short questionnaire concerning psychological state. The percipient adjusted the frequency content and volume of a white noise tape so that it was both comfortably loud and pleasant to listen to, and lay down on a reclining chair. The experimenter affixed two halved ping-pong balls over the percipient's eyes and adjusted a red lamp overhead so that the illumination level was comfortable. The experimenter reminded the percipient that all mentation, not only visual imagery, was worth reporting. When the stopwatch read ten minutes, the experimenter placed the headphones over the percipient's ears, and the session began. The experimenter retired to an adjacent cubicle and transcribed the percipient's mentation report which was heard via a microphone link, noting the halfway-time on the transcript. From the cubicle, the experimenter could survey the corridor outside via a TV monitor to ensure that the agent did not approach the laboratory.

After the percipient had spent 30 minutes in the Ganzfeld, the experimenter switched off the red lamp to indicate that the session had ended. The percipient completed a questionnaire concerning his or her psychological state during the trial and the types of mentation which occurred during the two halves of the session. He or she then checked the transcript for accuracy, divided it into separate items and indicated which images were bizarre, vivid, recent memory, nonvisual, highly colored, vague, or fleeting. The experimenter retrieved the target set number from her office, returned to the laboratory and took a duplicate judging set from a locked box. She showed the percipient the judging set and asked him or her to place the pictures in rank order of both liking and of correspondence to the mentation. Having recorded the percipient's judgments, the experimenter fetched the agent to provide feedback for the percipient.

The mentation transcripts and judging sets were sent to two independent judges; all planned analyses and predictions relate to their data only.

The average sum-of-ranks assigned to the targets was not as predicted significantly less than chance (a sum-of-ranks of 53.5 was obtained with a mean chance expected value of 50, $N = 20$). There was no significant difference in scoring between the two

conditions as shown by a comparison of the z-score of the sum of item-by-item correspondence rating points assigned to the target in each half of the session. Contrary to prediction was the lack of significant correlation between the z-score of the highest-ranked picture on each trial and the rank assigned to the target, which would have indicated that trials on which one picture stood out above the rest in terms of correspondence to the mentation report would be more likely to be successful than those trials on which all the pictures in the target set corresponded roughly equally to the mentation report.

Pearson correlations were planned for each judge between 30 questionnaire measures and the z-score of overall correspondence rating points assigned to the target on each trial. For the percipient, lack of motivation before the session ($r = 0.484$, 18 df, $p < 0.05$, two-tailed, Judge 2), tension after the session ($r = 0.657$, 18 df, $p < 0.01$, two-tailed, Judge 2), structured rather than dreamlike imagery ($r = 0.469$, 18 df, $p < 0.05$, two-tailed, Judge 1), bad mood ($r = 0.569$, 18 df, $p < 0.01$, two-tailed, Judge 2), and unpleasantness of experience in the Ganzfeld ($r = 0.480$, 18 df, $p < 0.05$, two-tailed, Judge 2) correlated positively with success as measured by z-score.

For the agent in the "experiencing" condition, confidence of ESP occurring correlated positively with z-score as predicted ($r = 0.392$, 18 df, $p < 0.05$, one-tailed, Judge 1). In the "hoping" condition, the amount of time spent hoping for success ($r = 0.515$, 18 df, $p < 0.05$, two-tailed, Judge 1), the amount of time spent thinking of the percipient ($r = 0.634$, 18 df, $p < 0.01$, two-tailed, Judge 1), anxiety to succeed ($r = 0.530$, 18 df, $p < 0.02$, two-tailed, Judge 1) and amount of conscious effort ($r = 0.527$, 17 df, $p < 0.05$, two-tailed, Judge 1) correlated positively with z-score.

The reversal of the usual correlates of success for percipients--with motivation, relaxation, unstructured imagery, good mood, and pleasantness of experience in the Ganzfeld--and the significantly worse performance on fleeting images, contrary to prediction, might suggest an inclination to psi-miss on the part of percipients, whereas the correlation of generally "positive effort" with performance on the part of agents may indicate their attempt to influence the percipient towards psi-hitting, perhaps resulting in the observed overall chance level of performance.

There was no support for the hypothesis that mentation would be more varied in modality in the "experiencing" than in the "hoping" condition, nor did particular modalities used by the agent appear more frequently than chance in the percipient's mentation, nor could percipients tell in which part of the trial each condition had occurred, as had been expected. However there was a tendency for percipients to report more spontaneous, dreamlike thought in the "hoping" than in the "experiencing" condition, as predicted (binomial $p = 0.07$, $N = 12$, one-tailed).

For each category of mentation, the percentage of points allocated to the target on the basis of each category was compared to chance. For judge 1, scoring on the basis of unstructured imagery was significantly above chance ($z = 2.35$, $p < 0.019$, two-tailed).

COGNITION AND MOOD DURING GANZFELD: THE EFFECTS OF EXTRAVERSION AND NOISE VERSUS SILENCE

Rex G. Stanford, † Raymond F. Angelini, and Amy J. Raphael (St. John's University)*

This study tested two hypotheses concerning the role of traditional levels of noise in Ganzfeld: a) Noise during Ganzfeld reduces higher-level cognitive processing; and b) more extraverted individuals enjoy the session and relax more because their generally lower level of arousal (H. J. Eysenck, The Biological Basis of Personality, 1967) means that they are not over-aroused by the stimulation produced by the noise.

The hypothesis of a reduction in higher-level processing due to noise was tested by examining predictions concerning subjects' continuous-association responses during Ganzfeld: a) Noise will produce, across subjects, smaller proportions of logical-coordinate, superordinate, subordinate, synonym, abstract-adjective, and abstract-noun responses than will silence; and b) noise will produce, across subjects, a greater mean interresponse interval than will silence. (In continuous association the subject simply says single words as they come to mind; initially the experimenter supplies a single word to start the association, but thereafter the subject is not required to associate to that starter word, but says words as they come to mind.)

For our Ganzfeld sessions involving noise, the Eysenck hypothesis linking extraversion to lower levels of arousal predicts that extraversion will correlate positively with the degree of relaxation experienced and with reported liking for the Ganzfeld session. Each subject also experienced a Ganzfeld session with silence, and no such correlations were expected there due to the absence of special, strong stimulation.

This study also examined whether noise, as contrasted with silence, produces a different factor structure in continuous associations produced during Ganzfeld.

Subjects were 40 unpaid volunteers (30 women; 10 men) re-

*We are grateful to the Parapsychology Foundation, Inc. for its support, which made this study possible.
†Throughout this volume, a dagger indicates the speaker.

The following paper, which touches on issues relating to the information theoretic approach discussed in this thesis, also appeared in Research in Parapsychology 1984.

ogy. I believe it is preferable to other psychological theories because it explains why OBEs involve the viewpoint they do as well as predicting other specific features derived from memory models.

The final test is the theory's predictions. I suggest that features of the OBE should correspond to those of models built from memory and imagination. For example, common OB positions should correspond to those which are easiest to visualize. Tasks which are easy to perform in imagination should be easy in the OB state and vice versa. In addition, people who are likely to have OBEs should be good at visualizing scenes from alternative positions. Those who can induce OBEs voluntarily must also be good at ignoring sensory input and have vivid and well-controlled imagery. Although some of these predictions are common to other theories, others are more specific and could provide tests of the theory presented here.

Finally, there are implications for other ASCs which occur whenever the input-controlled model is replaced by some other, internally generated, model. These include dreaming, lucid dreaming, meditation, and mystical experiences. I suggest that we shall make better progress by studying them all in terms of a person's "model of reality."

THE VALIDITY OF SIGNAL DETECTION THEORY AS APPLIED TO ESP

Julie Milton (University of Edinburgh)

Signal detection theory (SDT) has been successfully applied in psychophysics to study the detection of very faint sensory signals. Its major asset is that it allows a measure of an observer's sensitivity to a sensory signal which is independent of the observer's criterion for reporting a signal's presence. Since ESP studies generally deal with small deviations from chance performance, and since psychological variables probably affect subjects' response strategies, SDT could offer parapsychologists a means of looking through subjects' response biases to their underlying sensitivity.

A number of ESP studies have used SDT-based measures of sensitivity as measures of performance (Zenhausern, Stanford, and Esposito [RIP 1976, 170-173]; Mitchell [RIP 1981, 115-119]; Stanford and Angelini [RIP 1983, 35-38]). The question dealt with here is whether we are testing the validity of SDT for ESP in the most appropriate way.

In SDT experiments, observers are presented with some trials on which noise alone is present and some trials on which a faint signal is added to the background noise. It is assumed that the observer decides whether a signal is present or not according to the

magnitude of sensation evoked on each trial. The greater the sensation, the more confident the observer will be that a signal was present against the background of noise. The theory requires that an observer can order sensory events on a scale and base his or her responses on the relative amounts of evidence for a signal provided by sensory events. This is the major assumption underlying signal detection theory and unless an observer's confidence of the presence of a signal relates to the probability that a signal is present, the theory may be applied. The more confident an observer is that a signal is present, the greater the probability should be that he or she is correct. Is this true of extrasensory perception?

Confidence-calling and response-bias studies are quite close in conceptual terms to the SDT approach in that they attempt to relate degree of confidence or strictness of criterion for reporting the presence of a signal to performance. If the assumption required for the application of SDT is correct for ESP so that subjects can compare extrasensory events along a scale, then subjects should score more extremely on high criterion responses (confidence calls and counter-bias responses) than on the other responses. When a subject makes a confidence call or counter-bias response, then presumably the amount of evidence that his or her response is correct has passed his or her criterion, and the probability of a correct response will be higher than if the evidence was slight. However, although much confidence-calling work fits this pattern, Humphrey and Nicol (JASPR, 1955, 3-37) and Fahler and Osis (JASPR, 1966, 340-346) obtained significant psi-hitting on confidence calls with significant psi-missing on the other responses. Carpenter (in Wolman, Handbook, 1977, 202-272) points out in his review of response-bias work that psi-hitting on counter-bias responses is often accompanied by psi-missing on pro-bias responses. The signal detection model cannot be applied in a straightforward way to interpret all of these studies, since criterion seems to affect not only magnitude of performance but often its direction as well.

The confidence-calling and response-bias results may indicate that responses leading to psi-hitting may be phenomenologically different from those leading to psi-missing under some circumstances, or that the psi-hitting with psi-missing pattern is something which occurs when subjects are attempting to discriminate between qualitatively different types of stimuli, as opposed to the usual purely quantitative signal detection task. It may be possible to apply SDT within each group of subjectively similar responses, but this is something that would need to be tested directly.

A direct test of the applicability of SDT to ESP seems to be needed. According to Green and Swets (Signal Detection Theory and Psychophysics, 1966), the major test of the validity of the SDT analysis is the comparison of the measure of discriminability, d', obtained by different SDT procedures such as the "yes-no" and the "rating" procedures. In both procedures, subjects are given some trials on which noise alone is presented and some on which a signal is added to the noise. In the "yes-no" procedure, subjects are re-

quired to state on each trial whether or not a signal was present. In studies using the "rating" procedure, subjects are asked to give a rating of their confidence that a signal was present. It is assumed that d' is independent of the procedure used. In order to see if this was the case with ESP, a large number of pen-and-paper ESP tests were handed out at Edinburgh University's Societies Fair. Thirty-eight usable tests were returned. Each test consisted of two ESP tasks; on the first ("yes-no") task, subjects were presented with 100 blank boxes, and asked to place a "+" in those that they thought contained a "+" on the target sheet, and to leave the others blank. On the second ("rating") task, subjects were asked to place a number from 1 to 5 in each of 100 blank boxes according to their confidence that a "+" was present in the box on their target sheet. Corresponding to each numbered response sheet was a target sheet with some boxes containing a "+" and the rest blank, as determined by using a random number table. All the target sheets were kept in a locked box in my office. The Spearman rank correlation coefficient for the two measures of d' obtained from each subject for the two procedures was -0.01 (36 df), demonstrating not even a suggestive positive relationship between the two measures.

The lack of relationship between the two measures may have been due to such factors as the relatively small number of subjects who returned their tests or because each subject completed too few trials. However, other experimenters have obtained statistically significant relationships with d' using a number of trials comparable to my own study. Unfortunately, if ESP does not comply with SDT's assumption and subjects are simply guessing right, d' reduces to the usual "number of correct guesses" measure of ESP performance. This being the case, obtaining significant relationships with d' does not demonstrate the SDT's validity for ESP.

This problem would also have contaminated any positive correlation between the measures of d' obtained using the two different procedures of the study reported here. In fact, it is extremely difficult to distinguish mathematically between "guessing" and SDT-style "magnitude judging" in a "yes-no" experiment. It would seem that the only way of testing the theory's applicability is to get closer to SDT's underlying assumption and examine whether a subject's confidence rating that there is a signal is related to the probability that a signal was present; the signal detection model would require that as a subject's confidence that a signal was present increased, the probability that a signal was present would also increase. Inspection of the data from the "rating" procedure part of the study gives no support for this, but this may be due to the general lack of evidence for ESP in the study overall.

I would like to recommend, therefore, that before d' is used generally in forced-choice studies as a performance measure, more work be done on directly testing the underlying assumption of SDT. This would mean using the appropriate procedure of a mixture of trials on which a signal is present and trials on which no signal is present, rather than a forced-choice between two types of symbols.

The rating procedure can be used to give measures of the subject's confidence that a signal is present, or the subject's criteria may be experimentally manipulated by varying the proportion of trials on which a subject may state that a signal is present. In addition to placing such studies firmly within SDT's experimental procedures, it could be useful to apply analyses separately for categories of responses which feel qualitatively different to a subject. For example, Schmeidler's (JP, 1964, 109-125) finding that confidence calls produced significant psi-hitting only for subjects who made very few confidence calls may indicate that results expected by SDT may be found by looking at the relationship between performance and criterion within a category of response (the category being, in this case, confidence calls). Such studies may validate the theory's applicability to extrasensory perception. Even if no such validation is forthcoming, the results may at least highlight interesting differences between the signal detection model and the behavior of ESP which could direct further research.

GOAL-DIRECTED AND OBSERVER-DEPENDENT PK: AN EVALUATION OF CONFORMANCE THEORY AND OBSERVATIONAL THEORY

Mario P. Varvoglis (Psychophysical Research Laboratories)

Traditional "cybernetic" models distinguish between receptive psi and PK, and posit that the latter involves both the unconscious collection of pertinent information through ESP, and the information-guided application of the PK "force." Though frequently mentalistic, such views implicitly assume some kind of energy or information transfer across space. They also allow for "displaced" PK, i.e., effects which are truly incidental to conscious or unconscious motives, and which may reflect either the "field-like" nature of PK or the lack of sufficient information for directing PK. Conformance behavior theory (CT) and observational theory (OT) depart from such "transmission" models of psi in viewing ESP and PK as a unitary process of "direct" (rather than physically mediated) causation, and in allowing for neither generalized nor "displaced" psi effects.

The CT model, developed by Rex Stanford, suggests that PK may be strictly goal-directed, and occur irrespective of the number or complexity of intermediate steps. In this view, PK is based simply on the existence of a contingent relation between a disposed system and a more labile (less constrained) system. Through this focus on "constraint" and "lability," rather than structural or informational complexity, the model encourages new experimental approaches and renders more comprehensible both spontaneous psi and the possibility of psi in simple organisms. At the same time, in positing that psi is independent of both energetic and informational factors, CT may imply that we cannot experimentally localize psi effects, but only point to the needs of subjects and experimenters

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